



- 7.2.3.7.5.2 A standing pipe (such as 55-gallon open ended drums, heavy PVC/CMP pipe, or culvert type material) tall enough to exceed the water level should be placed over the frac-out and sealed at the base by sand bags
- 7.2.3.7.5.3 Industrial grade PVC mesh with steel T-posts and natural straw bales installed above and below the crossing site where the depth of the waterway allows.
- 7.2.3.7.5.4 Or as directed by jurisdictional agencies.
- 7.2.3.7.6 Appropriate agency notifications shall be made per the Project Specific Communications Plan. After these procedures are implemented, any drilling fluid that has been contained will be returned to the entry pit for re-use or removed using a vacuum truck and then transported to an approved disposal site.
- 7.2.3.7.7 Additional depth below ground may be necessary to avoid heaving of surface.
- 7.2.3.8 INADVERTENT RELEASE OF DRILLING FLUIDS (FRAC-OUT) PLAN
 - 7.2.3.8.1 Contractor shall utilize an environmentally safe drilling fluid, in combination with established and proven drilling techniques, to minimize the potential for an inadvertent release of such fluids. Drilling fluid returns at locations other than the entry and exit points shall be minimized.
 - 7.2.3.8.2 All drilling fluids must be free of any additive that will adversely affect the environment. Precautionary measures shall be undertaken to minimize the impact of any inadvertent spillage of fluids on return or at exit of the HDD.
 - 7.2.3.8.3 Contractor shall employ its best efforts to maintain full annular circulation of drilling fluids. Drilling fluid returns at locations other than the entry and exit points shall be minimized.
 - 7.2.3.8.3.1 In the event that annular circulation is lost, Contractor shall take steps to restore circulation.
 - 7.2.3.8.3.2 If inadvertent surface returns of drilling fluids occur, drilling operations must cease and fluids shall be immediately contained with hand placed barriers (i.e. hay bales, sand bags, silt fences, etc.) and collected using pumps as practical.
 - 7.2.3.8.3.3 If the amount of the surface return is not great enough to allow practical collection and if permitted by the applicable permit or landowner agreement, the affected area shall be diluted with fresh water and the fluid will be



allowed to dry and dissipate naturally.

7.2.3.8.3.4 In the event that a boring fluid fracture, inadvertent returns or returns loss occurs during pilot hole boring operations, Contractor shall cease boring, wait at least 30 minutes, inject a quantity of boring fluid with a viscosity exceeding 120 seconds as measured by a Marsh funnel and then wait another 30 minutes. If mud fracture or returns loss continues, Contractor shall cease operations and notify the PG&E Representative. The PG&E Representative and Contractor shall discuss additional options and work will then proceed accordingly.

7.2.3.8.3.5 If the amount of the surface return exceeds that which can be contained with hand placed barriers, small collection sumps (less than five (5) cubic yards) may be used. If the amount of the surface return exceeds that which can be contained and collected using small sumps, drilling operations shall be suspended until surface return volumes can be brought under control.

7.2.3.8.3.6 Continuation of the drilling operation shall only be allowed to resume following containment and clean-up of the inadvertently released fluids.

7.2.3.8.3.7 At the completion of the drill, Contractor shall clean up the drill mud and dispose of it in an environmentally-approved manner, as required by permits or environmental regulations.

7.2.3.9 HDD FLUID RELEASE CONTINGENCY PLAN: HDD projects involving sensitive biological resources such as waterways, bodies of water, and wetland areas, require the development of a site specific frac-out contingency plan to deal with inadvertent releases of drilling fluids into terrestrial or aquatic environments. This plan shall be individually tailored to each project's size and related environmental concerns. The goal of the plan is to effectively control, manage, and report any surface release of drilling fluids associated with HDD operations.

7.2.3.9.1 Contractor shall submit a written HDD Fluid Release Contingency Plan prior to commencement of the HDD installation that will address prevention, detection, and response.

7.2.3.9.2 Types and amounts of materials needed and their relevancy to each particular project shall be discussed and determined in the planning portion of each project. The following is a general list that should cover most HDD



project situations:

- Industrial grade PVC mesh with Steel "T"-posts, pipe material (such as a 55-gallon open ended drums, heavy PVC/CMP pipe, or culvert material).
- Heavy weight plastic clean gravel filled sand bags (recommended 100)
- Silt fencing (300-feet recommended)
- Straw bales
- Straw log or wattles (100 feet recommended)
- Geotek filter bags, 10-by-12-foot size or equivalent
- Several 5-gallon plastic buckets
- Shovels (flat blade and round nose)
- Wide heavy-duty push broom
- Absorbent pads and plastic sheeting for placement beneath motorized equipment operating in the vicinity of a riparian/stream zone
- Vacuum hose (100-feet minimum)
- Portable pumps
- Vacuum trucks (800 and 3000-gallon capacities)

7.2.3.9.3 HDD FLUID RELEASE CONTINGENCY PLAN:
Contractor shall submit a written HDD Fluid Release Contingency Plan prior to commencement of the HDD installation that will address prevention, detection, and response.

7.2.3.9.4 HDD Fluid Release Contingency Plan shall provide a route for the HDD borehole within the anticipated soil strata so as to minimize the possibility of a frac-out. It shall contain a site specific frac- out response plan. It shall also provide a plan for the following:

7.2.3.9.4.1 Detecting the possible presence of natural or man-made soil disturbances or discontinuities that could cause a frac-out,

7.2.3.9.4.2 Monitoring of drilling returns and other plans to quickly detect the possible occurrence of a frac-out,

7.2.3.9.4.3 Limiting mud circulation pressures to avoid hydro-fracture of the overburden,

7.2.3.9.4.4 Defining who is responsible to perform the various notification and response functions,

7.2.3.9.4.5 And providing the equipment and materials that will be on hand to contain and clean up a frac-out if it occurs.

7.2.3.9.5 The HDD Fluid Release Contingency Plan will identify the personnel on site during the entire HDD installation process with responsibility for detecting whether a frac-out



has occurred. During nighttime operations, if they occur, and for HDD installations under waterways, any proposed special measures required for frac-out detection will be addressed.

- 7.2.4 **ENVIRONMENT PLAN:** Contractor shall submit an Environmental Plan that addresses matters related to Environmental Protection for the following requirements and in accordance with Section 1, Paragraph 13 Environmental Requirements:

7.2.4.1 noise control

7.2.4.2 protection of surface and ground water quality

7.2.4.3 limiting of vegetation clearing and disturbance

7.2.4.4 consultation with statutory authorities

- 7.2.4.5 **Environment Protection:** Contractor shall place silt fence between all boring operations and any drainage, wetland, waterway, or other area designated for such protection by contract documents, state, federal, and local regulations. Additional environmental protection may be necessary to contain any hydraulic or boring fluid spills. Contractor shall practice containment methods, utilizing berms, liners, turbidity curtains, and other corrective measures as necessary.

7.2.4.5.1 Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200 feet of any water body or wet-land.

- 7.2.5 **GENERAL:** Consists of General Contingency Plans that Contractor shall perform if required.

7.2.5.1 **NOTIFICATION PLAN**

7.2.5.1.1 Contractor shall follow notification processes with all contacts (Agency Notification).

7.2.5.1.2 Immediately notify on site Contractor supervisor and the PG&E Representative detailed on the Communications Plan.

7.2.5.1.3 Make all notifications to county and state agencies as appropriate and as required by the regulations of the local emergency services. A copy of the Communications Plan must be in possession of Contractor's on-site supervisor.

7.2.5.1.4 As applicable, the following agencies may be notified in the event this contingency plan is implemented: California Department of Fish and Game (CDF&G), Regional Water Quality Control Board (RWQCB), California State Lands Commission (CSLC), U.S. Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USF&WS), and other entities as appropriate (local fire department, Highway Patrol, Rail Road, etc.).

7.2.5.2 **CONTAMINATED**



- 7.2.5.2.1 PG&E and Contractor will develop criteria and sampling protocols to determine when drilling fluids are to be classified and handled as hazardous waste.

7.3 HORIZONTAL DIRECTIONAL DRILLING REPORTS

- 7.3.1 GENERAL: To consists of reports that shall always be maintained and provided by the Contractor.

- 7.3.1.1 PRE BORE PATH LOG: Contractor/Operator shall maintain and provide PG&E with a pre bore path log at the completion of the project. The pre bore path log shall meet these requirements:

- 7.3.1.1.1 Record the guidance system data during the actual crossing operation,

- 7.3.1.1.2 Furnish plan and profile drawings based on these recordings, showing the actual location horizontally and vertically of the proposed installation, and all utility facilities found during the installation, and

- 7.3.1.1.3 Certify the guidance data to the capability of the (MGS) Magnetic Guidance System.

- 7.3.1.2 BORING LOG: Contractor and/or Operator shall maintain HDD Bore Logs in duplicate form to be exchanged by Contractor and the PG&E Representative. Information from these bore logs shall be recorded on the Works as Executed Drawing for handover or as-builts to Contractor and/or Operator. Information provided shall include for each bore, as a minimum:

- 7.3.1.2.1 Project name and location

- 7.3.1.2.2 Contractor Details

- 7.3.1.2.3 Date and Time

- 7.3.1.2.4 Bore Number

- 7.3.1.2.5 Bore Data:

- 7.3.1.2.5.1 Size and Number of conduits installed

- 7.3.1.2.5.2 Depth below finished surface level to the top of the bore at approximately 3m spacing

- 7.3.1.2.5.3 Grade

- 7.3.1.2.5.4 Alignment with property boundary

- 7.3.1.2.5.5 Rate of Penetration

- 7.3.1.2.5.6 Utility Crossing

- 7.3.1.2.5.7 Other information considered necessary by either Contractor or Liaison

- 7.3.1.2.6 Preparer/Contractor shall provide information in the Bore Log about any changes from the initial construction survey and include a statement and explanation of the calculation method used.



- 7.3.1.3 Contractor shall provide a complete set of Boring Logs to PG&E within fourteen (14) calendar days after the completion of work. Boring Logs shall be signed by both Contractor and the PG&E Representative verifying their accuracy.
 - 7.3.1.3.1 Contractor shall provide a Post Construction Report that includes:
 - 7.3.1.3.1.1 Copies of Bore Logs and Guidance System Logs
 - 7.3.1.3.1.2 Final Bore Log identifying length of conduit installed, type of product, machine size, and depth of pipe at every six (6), 10, or 15 feet (depending upon size of drill rig.)
- 7.3.2 **ADDITIONAL REPORTS, IF REQUIRED:** Consists of reports that will only be provided by the Contractor if required by local, state, federal, and jurisdictional mandates.
 - 7.3.2.1 **GRID SURVEY:** If required, when drilling under sensitive structures such as aqueducts and highways, Contractor shall provide a highly-accurate grid survey of the surface elevation of structures along the proposed borehole path, both before drilling commences, and after the HDD installation is complete, in order to demonstrate that the drilling of the HDD borehole, and pulling-in of the HDD pipe string, did not result in heaving or settlement of the sensitive structure. This requirement is typical of most Caltrans Highway crossings. Contractor will retain a Registered Land Surveyor to generate the before and after surveys and, if required, during construction.
 - 7.3.2.2 **FINAL AS BUILTS:** Final as-builts showing down hole weld locations as well as all other requirements of the Contract. Contractor shall produce appropriate shape files for all welds and project the welds to their final down hole locations to provide a complete as-built for the drilled string. All shape files shall be accumulated in accordance with PG&E's most recent requirements for GPS as-builts.



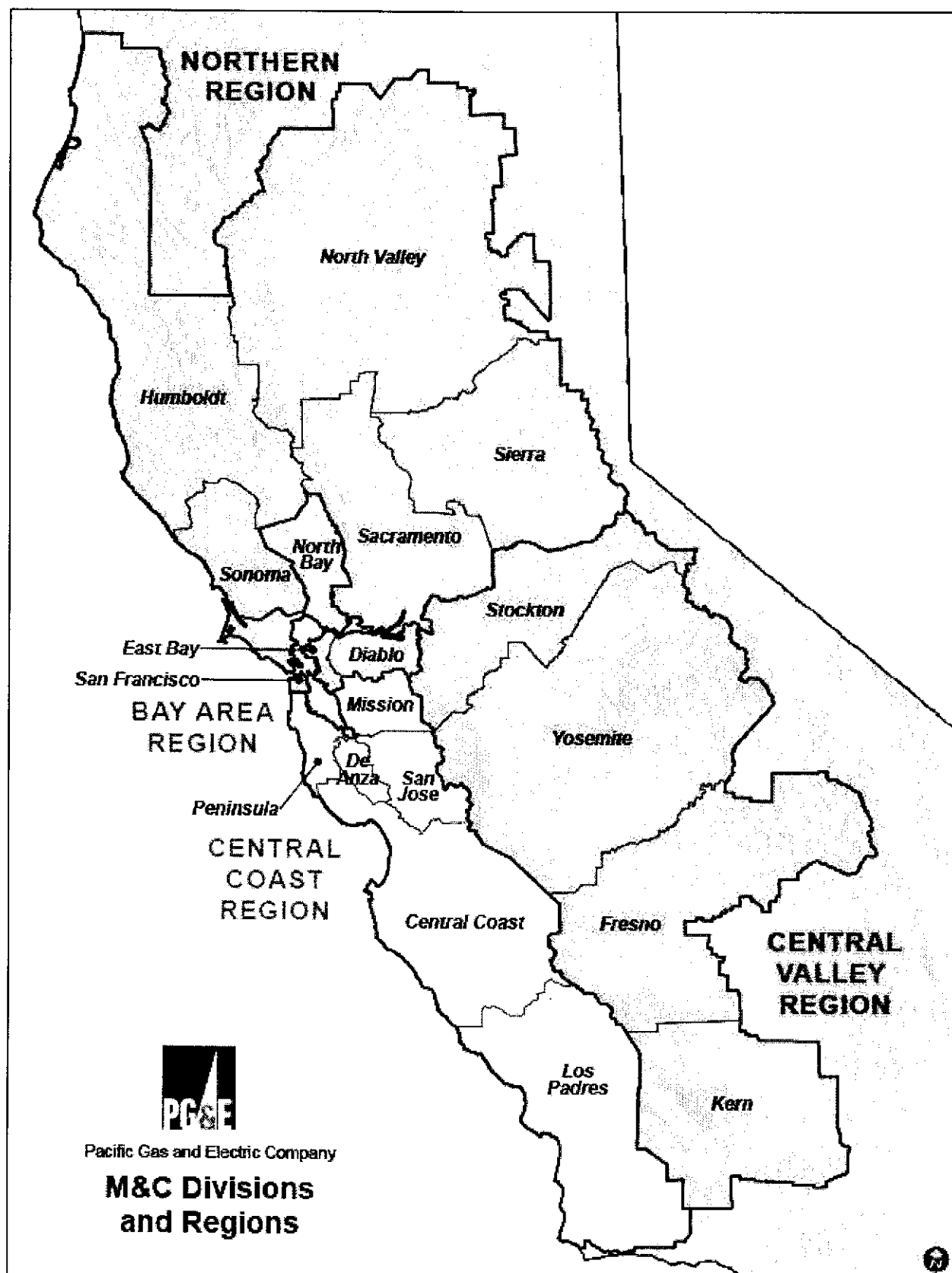
Attachments



**Pacific Gas and
Electric Company®**

**Attachment 8B MSA No. 4400010156 Elect Dist. Specification
No. 6603 Ver. 2.0
Electric Overhead, Underground, and Civil Construction
Attachments**

Attachment A





Attachment B

(Rev.01/12) Contract Management

Field Authorization for Addition/Deduction of Work (Instructions)

Field Authorizations for Construction Projects

A field authorization (Form 62-0675) is used for the addition or deletion of work. This allows the contractor to proceed with necessary work in the field that falls within the scope of the contract until a Change Order (CO) can be documented, approved, and executed.

These changes are accumulated and grouped together "after the fact" in a CO. Only work supervisors with at least PL1 approver role can approve field authorizations.

Restrictions and Uses of Field Authorizations

Field authorizations **shall not be used** to:

- Make changes that will include work that is outside the specified contract's original scope of work or modify the approved form
- General or Specific Conditions of the contract.
- Take the place of a CO.

Proper Use of Field Authorizations:

Field authorizations **can be used** to document clarifications in scope that result in changes to the work when it makes good business sense to add or deduct a portion of the work when the contractor must start the additional or deducted work immediately.

Examples of the proper use of field authorizations are:

- To avoid stoppage of work due to discovery of unknown field conditions; and
- To clarify discrepancies in the specific conditions.

The contract administrator shall keep track of the total contract value, including all previous COs and Field Authorizations, to ensure the project is under the amount for that contract in the approved job estimate. Prior to issuing Field Authorizations, determine if an approval is required by the budget owner for the additional work.

Field Authorization Requirements

Field authorizations need to include the following to document the need for use of an immediate authorization that is later translated into a SRM shopping cart to process a request for a CO:

- Complete a field authorization for any changed work condition at the time of the occurrence;
- **Describe the work and the agreed upon price (either lump sum or a not to exceed amount) or deducted amount. Answer these questions about the work: what, where, how, when, who and how much;**
- Identify and price out each changed work condition in the field authorization to establish the revised work scope of what the contractor was responsible for and to provide protection to PG&E should a dispute arise later on. Ensure that all revisions in work scope are documented in the subsequent CO;
- Attach supporting documentation for any changes in price obtained from the contractor to the field authorization. This must include a breakdown of the price quotation in terms of an estimate of labor,



materials, and equipment to be used, as well as all markup fees. The breakdown must also be included in the subsequent CO;

- Itemize the field authorization for a subcontractor's work in a similar manner and the subcontractor's proposal for a field authorization must be provided on the subcontractor's letterhead; and
- Number field authorizations consecutively for each contract.

Field Change Disputes

If there is a dispute with a contractor about whether the contractor is responsible for a portion of work, use a field authorization to acknowledge that the contractor was directed to proceed with the work. This will provide the contractor with a written directive for the disputed work, and allows the work to proceed without delay to the project. The decision to proceed must take safety considerations into account at all times.



Field Authorization for Addition/Deduction of Work

DATE: _____

- | | |
|----------------------------------|-------------------------|
| 1. FIELD AUTHORIZATION NO. _____ | 2. ORDER NO./PCC _____ |
| 3. CONTRACTOR _____ | 4. CONTRACT NO. _____ |
| 5. DATE WORK TO OCCUR _____ | 6. CHANGE ORDER # _____ |

7. **Specific description of work to be added or deleted: location of work (where it was done), what was done and why.** For hourly rate work, list labor and equipment classifications, hours of work, and hourly rates as applicable.

8. TOTAL LUMP SUM OR NOT TO EXCEED (UNIT PRICE OR
TIME & MATERIALS) AMOUNT

This document shall be **used to prepare a Contract Change Order** and to allow **additional work to proceed until a Contract Change Order can be executed**. Compensation to Contractor for above work will be the amount shown above as agreed upon by PG&E and Contractor and as authorized by a Contract Change Order. **Contractor may not invoice or receive payment for this work until a Contract Change Order has been executed by both parties.** PG&E reserves the right to suspend and/or cancel the above described work at any time. Should the above described work be canceled by PG&E, Contractor will be reimbursed for actual costs incurred up to the time work was canceled.

9. PREPARED by PG&E with Signature	DATE	10. APPROVED/or RECOMMENDED by PG&E Supervisor with Signature	DATE
11. ACCEPTED by CONTRACTOR'S SIGNATURE		DATE	

Attachment C**Safety Incident, Work Procedure Error and Planned Outage Reporting
Requirements for Contractors Performing Civil and Electric Distribution Work**

For all safety incidents, work procedure errors, late planned outages and property damage involving work on PG&E facilities, Contractor shall complete the following reporting and investigation requirements:

- Immediately following an incident Contractor shall call PG&E's internal CPUC Electric Incident Reporting Hotline {425-973-CPUC (2782)} within 1 (one) hour and contact, by phone or email, the applicable PG&E contract supervisor. For serious incidents involving hospitalization, fatality or extensive damage, the PG&E Contract Manager shall also be notified. For planned outage issues, the applicable PG&E Supervisor shall be notified.
- Reporting Procedure
 1. Call the PG&E CPUC Hotline and leave the following information on the potentially reportable incident:
 - a. Time and date of the incident
 - b. Location of the incident including the address, City, County, and PG&E Region
 - c. Detailed description of the incident
 - d. Facilities involved in the incident (e.g., substation, circuit number and voltage, facility)
 - e. Names of fatalities and injured persons (if any)
 - f. Number of customers affected and names of any major customers.
 - g. Third-party property damage (if any)
 - h. Name and telephone number of the responsible person who can be contacted about the details of the incident
 2. An injury or a fatality must also be reported immediately to any one of the following:
 - Adeel Babar: 925-548-0814
 - Laxmi Terala: 925-768-6603
 3. Confirm that Safety Health & Claims (Help Line 415-973-8700, Option 1) was notified if the incident involves an injury or fatality or 3rd party property damage.
 4. Request that the Dispatch Operator include a notation with a time stamp in the Integrated Logging Information System (ILIS) and any other details pertinent to the incident.
- Within twenty four (24) hours, Contractor shall send a preliminary Incident Report of the investigation to the designated PG&E representatives. This report shall include any known information on the incident, apparent causes and any immediate corrective actions that have taken place.
- For all incidents other than Serious Incidents as defined in PG&E's Electric Operations Causal Evaluation Standard, Contractor shall complete a detailed investigative ACE (Apparent Cause Evaluation) report of the contractor's investigation within seventy two (72) hours and send it to the designated PG&E representative. PG&E's Electric Operations Causal Evaluation Standard GOV-6102 and the ACE report.
- Contractor may request an extension for incidents that require a more extensive investigation. This report shall include the following:
 - a. Description of incident including time, date, location, circuit, crew involved and actions taken to make safe.
 - b. Determined cause of incident.
 - c. Contributing factors which led to incident.
 - d. Human performance lessons learned.
 - e. Corrective actions to be taken.

Serious Incidents must be investigated in accordance with PG&E's Electric Operations Causal Evaluation Standard.



Contractor shall cooperate and provide reasonable assistance, and cause each of its Subcontractors to cooperate and provide reasonable assistance, to PG&E with any (a) incident analysis or investigations PG&E conducts following a safety incident and (b) regulatory or agency investigations and inquiries that arise as a result of the safety incident. Contractor shall supply PG&E with complete copies of all documents, photographs, witness statements, and other evidence related to the incident and all investigation materials promptly upon PG&E's request.

- For planned outages that involve more than 50 customers and begin or end more than 1 hour late the above criteria for preliminary and final reporting is also required (Incident and ACE report). This is for outages where the contractor is the responsible party due to lack of pre work, planning etc. It is not required if it is determined by PG&E that PG&E internal issues are the cause. An initial report with causes is due by 0700 the following day as these outages are discussed on the PG&E Daily Operations call.
- "Challenge" conference calls to discuss the incident and findings will occur within 1 to 2 days of the event when deemed required dependent on the incident.
- Upon receiving contractor's investigative report, and dependent on the incident, PG&E may also schedule a review meeting to discuss the incident and make any recommendations regarding it. A revised report from this meeting may be required.
- Follow up communications regarding completion of corrective actions concerning the incident are required until all have been completed.

Attachment D

Requirements for Contractor Utilization of PG&E Facilities

1. Protocols

- Understand yard emergency plan / contact information
- Understand Yard Safety and Code of Conduct
- Understand vehicular traffic flow and speed of travel in yard
- Understand storm water runoff situation
- Dumpsters and proper separation of waste materials
- Housekeeping
- Employee parking for personal vehicles
- Set up space in the yard i.e. separate pole storage etc.
- Understand working stock, offset cable and rapid response materials processes
- Neighborhood / sensitive customers nearby
- Rules around use of yard equipment in yard i.e. loader / forklift
- Contractor to have a designated yard person as it is a contractual requirement

A pre-meeting reviewing these protocols shall be conducted by the Contract Management Supervisor and include Corporate Security, Environmental Field Specialist, Building Mechanic, Remote Materials Lead and the contractor supervisor.

List of PG&E Maintenance and Construction Yards

Territory	PG&E Service Centers/Yards	Yard Size
North Bay	Martin	Large
North Bay	Antioch w/GC	Large
San Francisco/East Bay	Richmond w/GC	Large
San Francisco/East Bay	Oakland	Large
Central Coast	Salinas	Large
Central Coast	Edenvale	Large
Central Coast	Cupertino	Large
Central Coast	S Maria w/GC	Medium
South Central Valley	Bakersfield	Large
South Central Valley	Bakersfield GC	Large
South Central Valley	Fresno GC	Large
North Central Valley	Stockton	Large
North Central Valley	Merced	Large
North Territory	Chico W/GC	Large
North Territory	Redding w/GC	Large
North Territory	Santa Rosa	Large
North Territory	Willits	Small
North Territory	Woodland w/GC	Medium
North Territory	GC Lakeville (Gas)	Medium
North Territory	Ukiah w/GC	Medium



Attachment E

Contractor Work Checklist

(Rev. 02/14) Contract Management

PM: <u>Click here to enter text.</u>		NOTIFICATION: <u>Click here to enter text.</u>	
FOREMAN: <u>Click here to enter text.</u>		INSPECTOR: <u>Click here to enter text.</u>	
START DATE: <u>Click here to enter text.</u>		END DATE: <u>Click here to enter text.</u>	
START TIME: <u>Military Time</u>		END TIME: <u>Military Time</u>	
WORK ADDRESS: <u>Click here to enter text.</u>			
CUSTOMER OUTAGE: <small>(CUSTOMER OUTAGE TIMES)</small>		COMMERCIAL CUSTOMERS: <input type="checkbox"/> <small>(CHECK BOX IF COMMERCIAL CUSTOMER OUTAGE)</small>	
FROM: <u>Military Time</u>		TO: <u>Military Time</u>	
TRANSFORMER CGC#, METER NUMBER OR ADDRESS: <small>(PLEASE ADD ADDITIONAL INFORMATION ON REVERSE)</small>			
<u>Click here to enter text.</u>		<u>Click here to enter text.</u>	
<u>Click here to enter text.</u>		<u>Click here to enter text.</u>	
<u>Click here to enter text.</u>		<u>Click here to enter text.</u>	
RGWO:		YES <input type="checkbox"/> NO <input type="checkbox"/>	
APPLICATION FOR WORK:		YES <input type="checkbox"/> NO <input type="checkbox"/>	
LIMITS <small>(CLEARANCE, NOTIFICATION, NON-TEST, TRANSFORMER OUTAGE, EQUIPMENT INSTALLATION)</small>			
1. <u>Click here to enter text.</u>			
2. <u>Click here to enter text.</u>			
3. <u>Click here to enter text.</u>			
4. <u>Click here to enter text.</u>			
TREE TRIMMING: <small>(EXTRAORDINARY)</small>		YES <input type="checkbox"/> NO <input type="checkbox"/>	
NATURE OF WORK <small>(PROVIDE A BRIEF DESCRIPTION BELOW)</small>			
<u>Click here to enter text.</u>			
<small>CONSTRUCTION SKETCH MUST BE ATTACHED ON REVERSE!</small>			

INTERNAL USE ONLY

- ☐ Confirm Job is Ready for Construction before Processing (Permit, ERTC Received, etc.)

CIRCUIT: _____	SSD: _____	CIRMAP #: _____
APPR: _____	<input type="checkbox"/> RGWO: _____	<input type="checkbox"/> CONDWG
FE: _____	<input type="checkbox"/> POD	<input type="checkbox"/> CIRMAP



**Pacific Gas and
Electric Company®**

**Attachment 8B MSA No. 4400010156 Elect Dist. Specification
No. 6603 Ver. 2.0
Electric Overhead, Underground, and Civil Construction
Attachments**

OC:

☐ AFW:

☐ LOGGED:



Attachment F

**PG&E PROVIDED MATERIALS FOR UNDERGROUND CABLE AND
OVERHEAD ELECTRIC FACILITY INSTALLATION**

PG&E MATERIALS LIST FOR PG&E FACILITIES ONLY- Contractor shall supply all materials for telecommunications and multimedia providers.

ELECTRIC

- Secondary Cable 1/0 and Larger
- Primary Cable 1/0 and Larger
- Aerial Cable
- Service Wire and Cable
- All Secondary and Primary Splices, Splice Assembly Kits, J-Boxes, Busses, Non-Compression Type Connectors and Multi-Tap Busses
- All Secondary and Primary Elbows
- Fault Indicators
- All Switches, Reclosures, Transformers, Interrupters, Capacitors, Fuses, Fuse Holders and Rectifiers
- Wood Poles
- Anchors
- Guy Wire
- Cross Arms
- Bracket Assemblies, Extended Racks, and Capacitor Racks
- Insulators
- Moldings
- Concrete and Fiberglass Secondary and Primary Boxes and Enclosures with Extensions and Lids

Attachment G

**PG&E PROVIDED MATERIALS FOR UNDERGROUND CONDUIT AND
GAS FACILITY INSTALLATION**

PG&E MATERIALS LIST FOR PG&E FACILITIES ONLY- Contractor shall supply all materials for telecommunications and multimedia providers. It is intended that PG&E provides all gas carrying main and service materials up to and including the service cock.

GAS

- 1/2" through 6" Plastic Gas Pipe
- 1/2" through 6" Plastic Gas Fittings
- Plastic Curb Valves
- Plastic EFV Valves
- 2" through 6" Steel Gas Pipe - Bare
- 3/4" through 6" Steel Gas Pipe- Wrapped
- 2" through 6" Steel Gas Weld Fittings
- Steel Insulated Fittings
- TD Williams and Mueller Line Stopple Fittings
- B26 Boxes W/ Lids
- Valve Boxes W/ Lids And Extensions
- Locating Wire
- Service Head Adapters
- Insulated Service Cocks
- Non-Corrodible Risers
- Meters
- Regulators
- Manifold Material, Spuds and Meter Washers
- Anodes
- Concrete Boxes with Extensions and Lids

1. DEFINITIONS

The following definitions are in addition to those provided in the General Conditions.

- 1.1. Jeeping - An electrical spark test to identify defects in the pipe coating.
- 1.2. Mechanical completion or ready-for-tie-in: Mechanical completion or ready-for-tie-in is achieved when PG&E is satisfied that:
 - 1.2.1. All piping is continuous between final tie-in points and no further tie-ins, other than final tie-in to existing line, are required; and
 - 1.2.2. Any anomalies exceeding the limits set forth in the project specification found during DCVG or caliper pig survey have been properly rectified to the satisfaction of the PG&E Construction Manager; and
 - 1.2.3. The hydrotests have been completed and documented and final test packages containing all documentation including, but not limited to, charts and documents calculations, have been received and accepted by PG&E; and
 - 1.2.4. The pipeline has been cleaned and dried to the appropriate dewpoint and is ready for final tie-in to the existing pipeline.
 - 1.2.5. All tie-in site excavations, including bell and sniff holes in which PG&E will perform tie-in, have been prepared by Contractor, and have been inspected and approved by GC
- 1.3. GPS: Global Positioning System
- 1.4. HDD: Horizontal Directional Drill
- 1.5. HSHD: Hot Spark Holiday Detector
- 1.6. DCVG: Direct current voltage gradient.
- 1.7. Roping - Allowable pipeline curvature such that elastic deformation is achieved.

2. PURPOSE

- 2.1. PG&E owns and operates natural gas pipelines throughout northern and central California. Various locations on these pipelines require replacement, expansion, or upgrade. It is PG&E's objective to accomplish the necessary pipeline Work safely and economically, within strict time constraints, while continuing to meet customer demand.
- 2.2. To achieve PG&E's objectives stated above, Contractor shall, on an as-needed as-requested by PG&E basis, provide all labor, material, tools, equipment and supplies for the investigation, construction surveying, acquisition of permits, procurement of permanent material when directed to do so by PG&E, project management, construction management, construction, and installation of the natural gas pipeline specified. If so instructed by PG&E, Contractor shall investigate existing conditions, plan suitable methods to achieve the required result and perform construction at the site. Contractor shall perform all Work required for a complete and working pipeline and appurtenances

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necessary to complete the scope of Work specified in the applicable Contract Work Authorization, whether or not each item necessary to do so is described.

- 2.3. In addition to all other warranties contained herein, Contractor warrants to PG&E that the Work performed under this Contract shall be performed with the degree of skill and care that is required by the highest good and sound professional procedures and practices, and in conformance with generally accepted industry standards prevailing at the time the Work is performed so as to ensure that the Work performed is correct and appropriate for the purposes contemplated in the Contract Work Authorization.
- 2.4. In addition to other requirements contained herein, all Work hereunder shall be performed in accordance with PG&E Gas Standards, PG&E California Gas Transmission Standards and U.S. Department of Transportation regulation 49 CFR Part 192; all industry standards must be the most current approved in Appendix A of Part 192. In the event of conflict, the most stringent will apply.
 - 2.4.1. In the event of conflict, Contractor shall immediately notify the PG&E Contract Administrator.

3. NONEXCLUSIVITY

- 3.1. The Parties agree that this Contract is not an offer of an exclusive contract between PG&E and Contractor, nor constitute a commitment by PG&E, whether express or implied, to contract with Contractor to perform or supply any work, nor is there any guarantee as to the volume or duration of work. PG&E expressly reserves all its rights including, but not limited to, the following: the right to utilize others to perform or supply work of the type contemplated by this Specification, the right to request proposals from others with or without requesting proposal(s) from Contractor for work of the type contemplated by this Specification, and the unrestricted right by PG&E to bid or perform any such work or any portion of such work.
- 3.2. As provided in Section 10 of this Specification, PG&E may elect to have certain Work described herein performed by the PG&E General Construction Department.

4. CONTRACT WORK AUTHORIZATION (CWA) - PROJECT SPECIFIC REQUIREMENTS

- 4.1. PG&E's request for Contractor's services shall be presented to Contractor in the form of a CWA, a sample of which is attached to these Specific Conditions. Each CWA must be signed on behalf of both Contractor and PG&E prior to Contractor commencing Work. Each CWA will have a detailed description of the Work to be performed by Contractor. This Contract provides the requirements for, and contains descriptions of, all pipeline Work for which PG&E anticipates retaining Contractor; however, PG&E may elect to retain Contractor to perform only a portion of the Work.
- 4.2. Depending upon the type of installation and PG&E's reasons for requesting Contractor's services, PG&E may elect to specify the detailed scope of Work or PG&E may elect to request that Contractor provide a proposal to PG&E with Contractor's recommended scope of Work. PG&E may also request that Contractor recommend the method to be used; i.e., direct burial, directional drilling, dry auger bore, microtunnel, or a combination of methods suitable to accomplish the project.
- 4.3. For each separate project, the CWA will identify a PG&E Project Manager. When requested, Contractor shall submit a detailed proposal to perform the Work identified by

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the Project Manager. Such proposal shall be presented in schedule format, broken down by phases, tasks and sub-tasks, and shall include Work completion dates to meet the project completion date specified by the Project Manager. Contractor's proposal shall include its manpower and equipment requirements to accomplish each task of the project, listed by hours per job classification and hours for each classification of equipment. Contractor's proposal shall also itemize all parts and materials required to accomplish each task of the project, providing estimated cost of such parts and materials and Contractor's mark up. With the proposal, Contractor shall provide resumes of the individuals Contractor anticipates will be assigned supervisory positions for the project. Contractor's proposal must include all labor, material, parts, tools, equipment, supplies and expenses to accomplish PG&E's stated objective, whether or not PG&E has identified each individual component necessary to do so.

- 4.4. PG&E may request that Contractor provide its price proposal in fixed lump sum price, unit pricing, cost reimbursable with fixed fees for profit and overhead, or time and material pricing. The request for proposal will identify the manner in which PG&E is requesting the price proposal. If PG&E elects to request Contractor's pricing in cost reimbursable form, the detailed requirements for that compensation structure will be provided with the CWA.

4.4.1. In the event PG&E has requested the price proposal in time and material format, Contractor shall provide an estimate of the total cost of the project in the level of detail required in Paragraph 4.3 above. Contractor's invoices shall be presented to PG&E in accordance with the General Conditions to this Contract.

- 4.5. In the event PG&E and Contractor are unable to agree upon schedule, scope, and/or cost proposed by Contractor, PG&E may elect to perform the Work itself or contract with another contractor to perform the Work.

- 4.6. Upon agreement between PG&E and Contractor as to schedule, scope, and cost proposed by Contractor, PG&E shall present to Contractor a CWA, prepared by PG&E's Project Manager and issued by PG&E's Contract Administrator. The terms and conditions of this Contract shall apply independently to each CWA. Contractor shall not commence any Work unless authorized, in writing, by a CWA fully executed on behalf of Contractor and PG&E. The issuance of any CWA shall not commit PG&E to any future services by Contractor.

- 4.7. Each CWA will provide Contractor a detailed description of the scope of Work to be performed together with the following information as applicable to the specified Work:

4.7.1. Sketch of Work area.

4.7.2. PG&E's format for cost breakdown, if applicable.

4.7.3. Environmental issues specific to the Work location, if known by PG&E.

4.7.4. Copies of regulatory permits specific to the Work if in PG&E's possession.

4.7.5. Soil borings in possession of PG&E, if any.

4.7.6. Easement/right of way detail, including PG&E's election as to who will acquire permits and easements and who will perform surveying and staking. If Contractor is to perform surveying and staking, the CWA will provide the starting and ending point and direction of survey. If Contractor is to acquire

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permits and easements, PG&E's specification for such acquisition will be provided with the CWA.

- 4.7.7. PG&E's design criteria will be provided to Contractor with the applicable CWA including, but not limited to, design pressures, beginning and end points, pipe diameter, wall thickness, pipe and coating specification, and valve locations.
- 4.7.8. PG&E's election as to who will procure pipe, valves and fittings, including contact information for PG&E's approved suppliers.
- 4.7.9. Welding procedures and welder qualification requirements applicable to the pipe specified.
- 4.7.10. Pipe coating specification applicable to the pipe specified.
- 4.7.11. PG&E's election as to who will perform tie-ins to existing operational gas transmission pipeline. If PG&E elects to retain Contractor to perform such tie-ins, the specification will be included in the CWA.
- 4.7.12. Construction drawings, if applicable.
- 4.7.13. Other information specific to the project, if any, in possession of PG&E.

5. SITE INFORMATION

- 5.1. The following site information is provided to Contractor for consideration in Contractor's scheduling, resource requirements determination, construction, Work coordination, and estimating purposes.
- 5.2. In the event Contractor deems it necessary to obtain soil boring and analysis prior to commencing Work, Contractor shall include with its proposal a detailed description of the number, depth, location and estimated cost of such soil bores. Analysis of the soil bore results shall be the sole responsibility of Contractor.
- 5.3. Contractor shall not bring any individual onto the Work site, other than Contractor's employees, unless authorized, in writing, by PG&E.
- 5.4. Easement and Right of Way
 - 5.4.1. Existing PG&E easements, temporary Work space, and/or rights of way for the Work will be shown on the construction drawings. In the event Contractor determines that the approved workspace is inadequate for performance of the Work, Contractor shall immediately so notify the PG&E Project Manager.
 - 5.4.2. Contractor's construction activities must be confined to the specific area of the right of way. Absolutely no activity is allowed outside the right of way. Contractor shall ensure that vehicles and equipment are parked either on a franchised roadway or within PG&E's right of way.
 - 5.4.2.1. Contractor shall provide the PG&E Construction Manager no less than one calendar week notice prior to commencing on-site Work on any portion of the right of way. Together with the PG&E Construction Manager, Contractor shall video streets, driveways, crops or significant items to be affected by the Work. These videos shall be labeled in such

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a way as to enable identification of the portion of right of way documented. These videos will be provided to the PG&E Project Manager prior to commencing Work as a portion of the project documentation required in Section 20 of this Specification...

- 5.4.2.2. Contractor shall provide the PG&E Construction Manager no less than one calendar week notice of the day on which Contractor will have completed all site restoration. Contractor and the PG&E Construction Manager will meet, at the Work site, with the applicable landowner/tenant and the PG&E Land Department Representative, to make a final inspection of the restored site, video the entire right-of-way, and obtain landowner/tenant signature to acceptance of the site restoration. The post-construction videos will remain with the PG&E Construction Manager as a portion of the project documentation required in Section 20 of this Specification.
- 5.4.3. Contractor shall clear the right of way of all debris, vegetation and concrete rubble before, during and after completion of the Work. Contractor's Work shall not produce new conditions which negatively impact adjacent properties.
- 5.5. During the course of Work hereunder, Contractor shall avoid tracking dirt from vehicles onto public and private streets and shall minimize noise and dust. Contractor shall continuously practice effective dust control measures appropriate to the area of construction. Contractor may be required to spray a bonding agent in the event water does not provide adequate dust control; in such event, the bonding agent shall be approved by the governing agency(ies).
- 5.6. Damage to property adjacent to the construction including, but not limited to, cosmetic or structural damage to adjacent property, shall be reported to the PG&E on-site representative verbally no later than two (2) hours following the incident and confirmed, in writing, to the PG&E Project Manager no later than twenty-four (24) hours following the incident. The incident shall also be included in Contractor's weekly progress report. Contractor shall follow all prudent construction practices which will help prevent damage to facilities including, but not limited to, using rubber pads on tracked equipment and rubber-tired vehicles where possible. In the event such damage is a result of Contractor's failure, refusal or inability, for any reason, to confine its activities to the specified Work area, the damage shall be repaired at Contractor's expense. In addition, Contractor shall not be provided schedule relief for the repairing of such damages.
 - 5.6.1. Prior to Contractor commencing any on-site Work, Contractor shall post large signs on the road along the construction route, the number of which will be specified by the PG&E Construction Manager. The signs shall be clearly visible with three-inch tall letters and shall provide the construction dates, Contractor's name and a local telephone number for contact by the public. The telephone number shall be a manned telephone during the business day and shall provide a voice mail system for non-business hours. The signs shall be placed at locations designated by the PG&E Construction Manager.
 - 5.6.2. Contractor shall verbally notify the PG&E on-site representative within two (2) hours of receipt of a public contact from any source or upon the occurrence of any incident that may have caused any damage to private property, public property, or PG&E facilities and shall confirm the notice in writing no later than 24 hours of receipt of such contact.

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- 5.6.3. Contractor shall maintain a public contact log for the duration of the project. The log shall provide the date, time, and identification of the caller, the nature of the problem, action taken and date resolved. Contractor shall provide the log to PG&E at the weekly construction meetings and with other project documentation required in Section 20 of this Specification.
- 5.7. Contractor shall provide PG&E a description of the portion of the Work site to be utilized by Contractor as the staging point for its equipment, laydown area for materials and tools, and facilities for employees and Subcontractor employees. An area shall also be designated for the staging and welding of the pipe.
 - 5.7.1. In the event Contractor enters into an agreement with any landowner or tenant for use of such areas, Contractor shall provide a copy of the fully signed agreement to the PG&E Project Manager prior to commencing Work.
- 5.8. Contractor shall provide the services of a survey company licensed in the State of California to ensure that the pipeline is installed as designed, in accordance with Construction Drawings, and to provide as-builts as required by Section 12 of this Specification. All wall thickness changes, bends, angles, bore entry, bore exit, tie-in points, valves, and changes in grade shall be located on the as-builts by GPS.
 - 5.8.1. PG&E will mark the proposed pipeline centerline, the approximate location of the existing pipelines, if any, and the temporary Workspace, laydown areas, and bore laydown areas, if any.
 - 5.8.2. Contractor shall offset pipeline centerline marks as required to allow excavation operation and shall set proposed cut marks in accordance with Construction Drawing profile. Contractor shall maintain offset centerline marks throughout the duration of the Work.
- 5.9. Contractor shall prepare the ingress and egress route for Contractor's equipment and the area on which Contractor shall place its equipment including, if required, the installation of compacted rock. Contractor shall not operate or park any equipment outside the prepared route.
- 5.10. If any portion of the area within which Contractor will perform Work is defined as environmentally sensitive, PG&E will provide site-specific information to Contractor within the CWA, together with the applicable regulatory permits.
- 5.11. In the event the Work is to be performed in an area actively cultivated with chemicals and fertilizer being applied, PG&E will attempt to so advise Contractor in the applicable CWA. Prior to Contractor personnel entering onto the site, Contractor shall contact the PG&E Land Department representative to obtain the name and contact information for the landowner(s) to enable Contractor to obtain a list of chemicals being used and the schedule for application. Contractor shall comply with all laws, rules, and regulations relating to protection and training of personnel for the chemicals listed. PG&E will provide Contractor the Land Department contact name and number with the notice of award of Work.
 - 5.11.1. The information provided to Contractor by PG&E will be the most current information available to PG&E and PG&E makes no representation that the list of chemicals provided to Contractor is complete or accurate.

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- 5.11.2. To the extent practicable, Contractor shall schedule and perform the Work in such a manner as to avoid performing Work while chemicals or pesticides are being applied or within the reentry time specified for the chemical being applied. In the event the schedule cannot be so arranged, Contractor shall provide all training and personal protective equipment necessary to safeguard all its employees or subcontractors from exposure to the chemicals.
- 5.11.3. It is Contractor's responsibility to determine the actual pesticides being applied within or adjacent to the Work site, the toxicity of the pesticides being applied, the dates of application, the required reentry time, and the requirement for training and personal protective equipment for its employees and subcontractors. A possible source for this information is the County Agricultural Commissioner.
- 5.12. At the conclusion of Work under any CWA and as frequently during the course of Work as practicable, Contractor shall restore the easement and right of way to the condition which existed prior to performance of the Work including, but not limited to, replacing fences and landscaping removed or damaged. Paving shall be replaced in accordance with the requirements of the governing agency.
 - 5.12.1. In the event Contractor fails, refuses or is unable, for any reason, to properly clean the Work area at the conclusion of the Work, PG&E will clean the Work area or retain a contractor to clean the Work area and withhold from payments due Contractor the actual cost to clean the area plus twenty (20) percent.
- 5.13. Utilities
 - 5.13.1. Temporary Electric Power - Contractor shall provide necessary electrical power for tools and equipment.
 - 5.13.2. Water - No water will be available at the site. Contractor must make provision for potable or non-potable water necessary to perform the Work hereunder.
- 5.14. Contractor shall notify "Underground Service Alert" (USA) at (800) 227-2600, at least four (4) working days prior to any excavating, trenching, or boring. Contractor shall maintain a current USA log which shall be available to PG&E, at the Work site, at all times. Contractor shall maintain USA marking on section of job for which construction activities are in progress.
 - 5.14.1. Pipeline construction may necessitate operation above, below, adjacent to or in the vicinity of PG&E's existing facilities and underground facilities of other utilities. Construction drawings may indicate certain aboveground utilities, drainage ditches and underground foreign lines such as water lines, telephone lines and other pipelines; however, PG&E makes no representation as to the accuracy of the locations shown. Locating all existing facilities is the responsibility of Contractor.
 - 5.14.2. Prior to Contractor commencing Work, Contractor shall pothole for location and depth of the existing PG&E pipeline(s). PG&E will mark the general locations of its underground facilities in the area of the Work; however, PG&E assumes no responsibility for the accuracy of such markings.
 - 5.14.2.1. In addition to other requirements provided herein, Contractor shall prospect for these pipelines in accordance with PG&E Gas Information

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Bulletin No. 151, Preventing Mechanical Damage to Gas Transmission Lines, a copy of which is attached to this Specification as Exhibit 1.

- 5.14.3. Contractor shall prospect for and expose all other existing substructures prior to Contractor excavating or drilling. Contractor shall also locate underground facilities in areas where Contractor will perform drilling operations.
- 5.14.4. Contractor shall exercise caution to avoid damage to or disturbance of these facilities and shall be held liable for any damages. Should damage occur, Contractor shall immediately notify facility owner and shall notify the on-site PG&E representative of the damage within two (2) hours of the incident and confirm the notice, in writing, to the PG&E Project Manager within twenty-four (24) hours of the incident. Contractor shall repair the damage at no additional cost to PG&E. Contractor shall make every effort to minimize damage resulting from the construction specified herein.
- 5.14.5. CONTRACTOR SHALL ARRANGE FOR PG&E STAND-BY PERSONNEL AT LEAST THREE WORK DAYS (72 HOURS) PRIOR TO EXCAVATING OR DRILLING AROUND ANY EXISTING GAS TRANSMISSION FACILITIES. CONTRACTOR SHALL NOTIFY THE PG&E DESIGNATED ON-SITE REPRESENTATIVE TO ARRANGE FOR STANDBY PERSONNEL.
- 5.15. In addition to other requirements stated in this Specification and the General Conditions to this Contract, during the term of this Contract, Contractor shall provide tools, barriers, space heaters, potable water, self contained toilets and related required washing facilities, shelter, and cleaning facilities as required by applicable federal, state and local rules, laws and regulations for performance of the Work and the safety of Contractor's and Subcontractor's personnel and equipment storage. Contractor shall be responsible for providing restroom/break facilities/areas for its employees or Subcontractors.
- 5.16. Job Site Storage
 - 5.16.1. Contractor shall ship the line pipe and appurtenances from the manufacturer's site to the jobsite and store and handle pipe and appurtenances at the jobsite.
 - 5.16.1.1. Prior to transporting the line pipe and appurtenances from the manufacturer's site, Contractor shall inspect the material for geometry and coating. Contractor shall immediately advise PG&E of defects and Contractor shall not load or transport such defective material. PG&E will not accept any claim for manufacturer defect after Contractor has transported the material to the Work site.
 - 5.16.2. Contractor shall receive, unload and inventory all Work materials, equipment and tools shipped to the project site, verify their suitability, and inspect for damage. Contractor shall promptly return any damaged or incorrect parts and new or correct material shall be ordered at no additional cost to PG&E. Contractor shall be responsible for security and safeguarding of all Work materials, equipment and tools stored on-site.
 - 5.16.3. All material must be shipped with corresponding material certifications and/or testing documents. Contractor shall retain such documentation at the jobsite and available to the PG&E Project Manager during the performance of Work under

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the applicable CWA. Such documents shall be provided to the PG&E Project Manager at the completion of the Work.

- 5.17. Contractor shall be responsible for coordinating with PG&E to determine all site-specific conditions including, but not limited to, construction personnel parking, sanitary and rest facilities, laydown and storage areas and coordination with other activities at the site.

6. ENVIRONMENTAL REQUIREMENTS

- 6.1. All hazardous materials necessary to perform the Work under this Contract shall be provided by Contractor and stored and handled on site, and disposed of, in accordance with all applicable federal, state, and local laws, regulations, and ordinances including, but not limited to, the Uniform Fire Code.
- 6.2. Prior to commencing any Work hereunder, Contractor shall advise PG&E, in writing, of the hazardous materials which shall be brought onto the PG&E site and shall provide the applicable MSDS for such materials. All containers of hazardous material shall be labeled by Contractor in accordance with all applicable regulations including, but not limited to, CalOSHA Hazard Communication Standard, prior to any container being placed on a PG&E site. Upon completion of each individual Work scope assigned to Contractor under a CWA and as frequently during the course of Work as practicable, Contractor shall properly remove all unused hazardous material from the site at no additional cost to PG&E.
- 6.3. Hazardous wastes generated on the Work site by Contractor in the performance of the Work hereunder shall be transported and disposed of off site by Contractor. It is Contractor's responsibility to ensure that such wastes are properly managed upon generation, transported, and disposed of in accordance with all applicable federal, state and local laws, regulations and/or ordinances. In the event PG&E determines that Contractor is in violation of any such laws, regulations, and/or ordinances, Contractor shall be responsible for all penalties and costs associated with such violation.
- 6.4. Contractor shall ensure that its employees or Subcontractors performing any Work hereunder have received the training required by federal, state and local regulations for hazardous waste workers, hazardous material handling, and hazardous material clean up with agency oversight and shall include, but not be limited to, Storm Water Pollution Control Plan and Hazardous Waste Contingency Plan. Contractor shall document to PG&E, in writing, that such training has been provided and that such training is commensurate with the job duties of each individual employee or Subcontractor in compliance with all applicable laws, rules, and regulations including, but not limited to, OSHA.
- 6.5. The Work location must be kept clean and part of each day shall be dedicated for Work site cleanup.
- 6.6. In the event there is a spill or release of hazardous material during the performance of Work, Contractor shall notify the PG&E on-site representative, by personal contact, within two hours of the incident. In this event, Contractor's notification must be made in person - the leaving of a voice mail or electronic mail message does not satisfy this requirement for notification. Contractor must confirm the notification, in writing, to the PG&E Project Manager no later than twenty-four (24) hours following the incident.
- 6.7. If Contractor or any of its Subcontractors create a release of a hazardous material or waste, and it is determined, in PG&E's sole judgment, (such judgment to be based upon

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reasonable information) to have resulted from Contractor's Work, Contractor shall properly clean up, remove, dispose and/or remediate the area including any contaminated soil or ground water, and perform other required environmental remediation action. All penalties and costs related to such removal, disposal and/or remediation of a contaminated area, contaminated soil, ground water, or other environmental remediation action shall be borne by Contractor at no additional cost to PG&E. In addition, Contractor shall not be granted schedule relief to perform such clean up.

- 6.8. If contamination from a release is discovered and is determined, in PG&E's sole judgment, (such judgment to be based upon reasonable information) not to be a result of Contractor's Work, PG&E shall remove, dispose, and/or remediate contaminated soil or ground water, or perform other required environmental remediation action. PG&E may, at PG&E's sole option, retain Contractor to remove, dispose and/or remediate contaminated soil or ground water, or perform other similar environmental remediation actions. In the event PG&E elects to retain Contractor to perform this work, the specific requirements shall be provided for by revision to the applicable CWA.
- 6.9. If Contractor discovers or becomes aware of contamination on the property, Contractor shall immediately notify PG&E's designated representative with a confirmation in writing.
- 6.10. All Contractor's activities shall be limited to the areas designated by PG&E. Contractor shall exercise extreme care in performance of the Work hereunder and in its daily cleanup activities. No scrap material or debris of any type shall be left on the site.
- 6.11. Contractor shall be responsible for all penalties and costs associated with Contractor's failure to observe environmental restrictions and requirements associated with the presence of endangered species and their habitat and/or cultural, historic or archaeological artifacts.
- 6.12. No soil shall be removed from the site or disposed of offsite unless specifically approved by the PG&E Project Manager or his/her designated representative. All excavated soil must be placed within the space designated by the PG&E Project Manager and in accordance with all applicable laws, rules, regulations and ordinances.
- 6.13. Contractor shall containerize and segregate drilling fluids, if applicable, from native soil. Contractor shall not allow drilling fluids to migrate onto the soil. Contractor shall transport and dispose of the drilling fluids as necessary to avoid any overflow of such fluids onto the site.
- 6.14. Contractor shall obtain all required permits for the use of temporary equipment including, but not limited to, air compressors and generators.
- 6.15. Contractor shall familiarize itself with all requirements of the regulatory permits issued covering the performance of this Work and, in addition to other warranties provided for herein, warrants to PG&E that Contractor shall perform all Work hereunder in accordance with all of the applicable terms, conditions and restrictions of such permits
- 6.16. Contractors who own or operate any off-road vehicle that is diesel-fueled, or alternative diesel fueled, and with an engine with maximum power rating of 25 horsepower or greater, shall adhere to the requirements set forth in California Code of Regulations (CCR) title 13 Section 2449. Examples include, but are not limited to, backhoes, loaders, bulldozers, motor-graders and diesel-driven forklifts.

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- 6.16.1. Contractors shall comply with all CARB enforcement of this Regulation. For more information regarding this CARB Ruling and its requirements, refer to the California Air Resources Board website.
- 6.16.2. Contractors who operate off-road spark-ignition engine; i.e., gasoline-powered, liquid natural gas-powered, compressed natural gas-powered, forklifts, sweepers/scrubbers, industrial tow-tractors or airport ground support equipment, whose engine is greater than 25 horsepower and greater than 1 liter displacement, shall adhere to the California Code of Regulations (CCR) Title 13, Sections 2775 – 2275.2.
- 6.16.3. Contractors who own or operate diesel-fueled, dual-fueled, or alternative diesel-fueled on-road vehicles with a gross vehicle weight rating (GVWR) greater than 14,000 pounds shall adhere to the requirements set forth in CCR Title 13, Section 2025. Refer to the California Air Resources Board website for a more detailed definition of affected vehicles and exclusions.

7. SAFETY

- 7.1. PG&E has a Site Safety tailboard specific to the Work location. Subsequent to award of CWA and prior to Contractor commencing any Work hereunder, PG&E's designated on-site representative shall conduct a site-specific Site Safety tailboard for Contractor's personnel. In addition, Contractor's supervisory personnel shall attend a Hazard Communication briefing conducted by PG&E's designated on-site representative on the specific hazards associated with the Work related to natural gas and any other conditions unique to the site which may be encountered. Contractor shall instruct each subsequently assigned employee or Subcontractor in the Site Safety tailboard and Hazard Communication requirements prior to any such employee or Subcontractor performing any Work hereunder. It is Contractor's responsibility to contact the PG&E designated on-site representative to schedule the instruction.
- 7.2. In addition to the PG&E Site Safety tailboard, Contractor shall comply with all applicable federal, state and local laws, rules, regulations and ordinances including, but not limited to, OSHA and Cal-OSHA. Contractor shall prepare any necessary job-specific Work Plans and Health & Safety Plans required for performance of Work and train its employees and Subcontractors in the requirements of such plans prior to commencing any Work. Contractor shall have a safety plan, which includes training for all Contractor and Subcontractor-supplied labor. Such safety plan shall include, but not be limited to, the requirements of Article 23 of the General Conditions and shall be in addition to, not in lieu of, PG&E's Site Safety Plan.
- 7.3. Contractor shall provide all tools and equipment required for the performance of the Work and to ensure the safety of its employees or Subcontractors. Contractor shall be responsible for ensuring that all its employees and Subcontractors are properly trained and qualified to use such tools and equipment prior to actual use. It shall be Contractor's responsibility to determine if any workspace is defined as confined space. If Contractor determines that any workspace so requires, Contractor shall ensure that confined space training is provided, as required, to its employees and Subcontractors in accordance with all federal, state and local regulations.
- 7.4. Contractor is responsible for the safety and adherence to safe work practices of all of its employees and Subcontractors. PG&E may perform regular safety audits; however, the performance of such audit by PG&E does not relieve Contractor of its responsibility for maintaining a safe, clean and orderly work place. PG&E reserves the right to halt any

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Work at the site due to safety violations. Work shall not continue until the violations are corrected to PG&E's satisfaction. Additionally, Contractor shall not be granted schedule relief nor charge PG&E for overtime or other costs incurred to return to schedule if Work is halted for safety violations.

7.5. Public Safety

7.5.1. Contractor is responsible for maintaining public safety around Contractor's vehicles, tools equipment, and spoils.

7.5.2. Contractor shall post "No Parking" and other traffic control signs; place barricades, K-rails, lights, cones, flares and reflectors as needed; utilize flagmen; utilize shoring and bracing; install steel plates at major street crossings and at the other locations required by good safety practices and/or jurisdictional agencies.

7.5.3. Contractor shall provide noise control for equipment which will be operating for extended periods of time or during the night.

7.5.4. Contractor shall provide trench crossings wherever necessary to permit the public, property owners or tenants to move across excavated trenches traversing public streets or private property.

7.5.4.1. Contractor shall not remove any trench crossings which permit the public, property owners or tenants to move across excavated trenches traversing public streets or private property. Convenient and readily accessible parking and entry to commercial establishments must be maintained.

7.5.5. Contractor shall adequately protect spoil, waste material and debris left overnight with barricades equipped with operating flasher lights and/or reflective tape to safeguard all persons and property from injury.

7.6. Contractor shall provide satisfactory protection and safeguards for controlling fire hazards on or near the job site. Fires of any type are not allowed on or near the job site.

7.7. USE OF EXPLOSIVES DURING PERFORMANCE OF WORK IS EXPRESSLY PROHIBITED UNLESS SPECIFICALLY AUTHORIZED, IN WRITING, BY PG&E. In the event Contractor determines that explosives are required in performance of the Work, Contractor shall submit to PG&E a detailed description of the location and nature of the obstruction requiring explosives. If PG&E agrees with Contractor's assessment, PG&E shall provide Contractor, in writing, specific limitations and specifications within which such explosives may be used. IN NO EVENT SHALL CONTRACTOR PROCEED WITH THE USE OF EXPLOSIVES UNTIL CONTRACTOR HAS RECEIVED SUCH SPECIFICATIONS, IN WRITING, FROM PG&E. PG&E providing, or failing to provide, these specifications does not relieve Contractor of the responsibility to use the explosives safely and in accordance with all federal, state and local laws, rules and regulations.

7.7.1. In the event Contractor uses explosives in the performance of Work, Contractor shall establish the means by which the inventory of such explosives is carefully controlled. Contractor shall document each item brought on site including, but not limited to, caps, powder, and primer cord. At the conclusion of the Work requiring use of the explosives, Contractor shall inventory and account for each and every explosive item brought onto the site compared to the inventory of

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explosive items used or remaining in Contractor's inventory. All unused explosive items shall be removed from the Work site immediately that the Work requiring use of the explosives is completed. Absolutely no dangerous materials may be left at the Work site. Contractor shall be responsible for all costs and penalties associated with any incident resulting from Contractor's loss or misuse of any explosive item.

8. CONTRACTOR PERSONNEL

8.1. Contractor Project Manager and Construction Superintendent

8.1.1. Contractor shall provide a Project Manager who shall be available at all times for the duration of the project under the applicable CWA. The Contractor Project Manager shall be the primary contact for PG&E during the course of Work hereunder for answers to concerns or resolution of problems including, but not limited to, project scope, project cost, material specification and procurement, installation, removal, testing, and project documentation. The Contractor Project Manager shall also be responsible for project scheduling, tracking and forecasting.

8.1.2. Contractor shall provide a full time, on-site, experienced and competent Construction Superintendent for the duration of this project who shall supervise and direct all phases of the physical Work including, but not limited to, Work by Contractor's and Subcontractor's labor forces. The Construction Superintendent shall be on site during the performance of any Work hereunder, shall supervise labor crews, and shall be responsible for the quality of physical Work and the acts of the labor being supervised.

8.1.2.1. Contractor's Construction Superintendent shall immediately notify the PG&E Project Manager of any unusual incident such as over pressure, accident or damaged facilities. If so requested by PG&E, the Construction Superintendent will provide, in writing, a detailed chronology of events and names and job classifications of individuals involved. Such report shall be provided no later than two (2) hours after Contractor's receipt of such request.

8.1.2.2. Upon receipt of a project-specific CWA, Contractor shall provide 24-hour local contact information for the individual to be assigned as Construction Superintendent. This contact information shall include name, local telephone number, cell phone number, pager number, and any other means by which PG&E can contact Contractor's Superintendent in case of job-site emergency.

8.1.3. In the event Contractor's Project Manager shall be unavailable or Contractor's Construction Superintendent shall be away from the job site during the Work, Contractor shall so advise the PG&E designated on-site representative no later than twenty-four hours prior to such absence together with the name and contact information for Contractor's substitute Project Manager or Construction Superintendent. PG&E shall not be invoiced for any cost associated with the training or familiarization of any substitute Contractor Project Manager or Construction Superintendent. Delays associated with the resignation, reassignment or absence of the Contractor Project Manager or Construction Superintendent are specifically considered to be delays within Contractor's control.

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8.2. Welder Qualification

- 8.2.1. Contractor shall ensure that each welder is tested and qualified for the type of pipe and procedure provided to Contractor with the applicable CWA according to the PG&E Gas Standard and in accordance with API Standard 1104 prior to performing the welding work specified in the CWA.
- 8.2.2. The qualification testing of welders will be administered by PG&E at a location designated by PG&E. Contractor shall schedule tests through PG&E by notifying the PG&E Project Manager five (5) days in advance of testing.
- 8.2.3. As part of the qualification testing, each welder shall be required to make a weld using pipe material of the same specifications as the pipeline specified within the CWA, and using the same electrodes specified for the pipeline per approved welding procedure. Each welder shall make the qualification test weld using the same welding technique, welding current, and travel speed that he or she will use if permitted to work on the pipeline installed under the applicable CWA.
- 8.2.4. Contractor shall furnish the same welding materials and equipment as those to be used on the pipeline, including line up clamp and beveling equipment. PG&E will furnish test material of the same type as to be used on the pipeline, coupon-cutting machine and testing equipment.
- 8.2.5. PG&E will cut and prepare all coupons from the test weld in accordance with API Standard 1104, most current edition.
- 8.2.6. The welder will be recognized as fully qualified only if, upon PG&E's inspection, the test weld coupons are acceptable and the weld is free of visible defects and presents a neat, workmanlike appearance.
- 8.2.7. PG&E will assign each qualified welder a number.
 - 8.2.7.1. Contractor shall retain, at the job site at all times, copies of PG&E welder certification together with documents sufficient to identify each welder as the individual certified. Failure to produce such certification and documentation may result in PG&E requesting that the welder be removed from the Work and any welds performed by such individual replaced by Contractor at no additional cost to PG&E.
- 8.2.8. Labor or standby cost for welders during tests and while waiting for test results shall be at no additional cost to PG&E.
- 8.3. Contractor shall respect the rights of the general public at all times. Contractor shall strive at all times to be courteous to all PG&E customers affected by the Work as well as all members of the general public. Contractor shall ensure that its employees and its Subcontractor's employees conduct themselves in a professional manner, and shall not allow its employees or its Subcontractor's employees to play radios, use profane, abusive language, or display gestures which could be interpreted by the general public as offensive or obscene. Conflicts between the general public and Contractor's and its Subcontractor's employees will not be tolerated.
- 8.4. If PG&E finds Contractor's or Subcontractor's employee to be unsatisfactory, unfit or discourteous to local residents, businesses, or the general public, Contractor or

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Subcontractor shall replace said employee immediately. Contractor or Subcontractor is not in any way required to terminate the employment of any employee replaced nor, by the terms of this Paragraph, does PG&E endorse or approve (expressed or implied) any termination by Contractor or Subcontractor of any employee replaced pursuant to this provision.

- 8.5. Contractor, understanding that PG&E places high importance on maintaining a positive public image, shall perform Work in a timely, conscientious and businesslike fashion with a minimum of delays and disputes. Accordingly, Contractor shall resolve all reasonably-based complaints from a property owner, resident, local business, and/or the general public within five (5) working days after notification by the complainant or PG&E, whichever is earlier.

8.5.1. As required in Paragraph 5.6 of this Specification, unless otherwise directed in the applicable CWA, Contractor shall post signs at the Work site, visible to the general public, providing Contractor name and twenty-four (24)-hour telephone contact number.

9. SCHEDULE AND REPORTING REQUIREMENTS

- 9.1. Contractor will be contacted on an as-needed basis to perform the Work.
- 9.2. For emergency repairs, PG&E may request Contractor to mobilize and report to the site as soon as practicable.
- 9.3. In order to coordinate Work under the applicable CWA with work to be performed by others and to ensure operation of the pipeline by the required date, Contractor shall ensure that the Work is planned and scheduled in the most safe, efficient, cost-effective manner possible.
- 9.4. Work shall be scheduled and performed by Contractor in such a manner as to provide for testing and release of completed Work to PG&E to meet required dates. In the event PG&E so requests, Contractor shall fully test and release to PG&E segments of the Work as they are completed and meet the test requirements of this Specification.
- 9.5. Contractor shall complete the Work in time to meet the milestone and project completion dates stated within the applicable CWA.
- 9.6. As soon as practicable after Contractor's receipt of CWA from PG&E and thereafter during performance of the Work as required herein, Contractor shall provide PG&E detailed project schedule and cost breakdown reports.
- 9.6.1. Upon receipt of CWA, Contractor shall provide PG&E a draft project schedule which shall depict, in chronological order, critical tasks, shop and on-site testing, Contractor submittals, sequence of tasks, task duration, task start and task completion dates. Contractor shall provide a detailed estimate of the cost of the total project in the format provided to Contractor with the CWA.
- 9.6.2. Prior to commencing any Work hereunder, Contractor shall submit a final detailed Work schedule, in a medium and format acceptable to PG&E, to the PG&E Project Manager for approval. The final schedule shall incorporate PG&E's required changes to the draft project schedule. The final schedule shall provide all information required in Paragraph 9.6.1 above. Contractor's final Work schedule shall provide detailed cost breakdown for each item in the

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schedule. In the event Contractor's final schedule or estimated cost differs materially from the draft schedule and cost estimate submitted by Contractor, Contractor shall highlight such differences and provide a detailed explanation of the reason for such differences.

9.6.2.1. For on-site work, Contractor shall provide PG&E the construction schedule and activities. Contractor shall provide the inventory of parts, special tools, rigging, and other devices and materials to ensure that the necessary items are, or will be, on site when required. Contractor shall provide all required documentation of mandatory and required environmental, safety, OSHA and Cal-OSHA training and welder certifications to the PG&E Project Manager. Equipment with internal combustion engines brought on site shall have current permits in accordance with this Specification.

9.6.2.2. If applicable, Contractor shall provide traffic control plans as required by the governing agency(ies).

9.6.3. Contractor shall provide the designated on-site PG&E representative no less than 24 hours' advance notice of any material change to the submitted final schedule and cost estimate. Unless otherwise directed by the PG&E Project Manager, the frequency and content of schedule updates and status reports will be as provided in Paragraph 9.7 below.

9.6.3.1. If Contractor discovers conflicts or discrepancies between construction documents or encounters changed conditions during the course of the Work, Contractor shall immediately notify the PG&E on-site representative verbally with confirmation in writing within forty-eight (48) hours by submitting a Request for Information (RFI). The RFI shall provide a detailed description of the conflict or changed condition together with Contractor's suggested resolution and the estimated schedule and budget impact.

9.6.3.2. If so instructed by the PG&E on-site representative, Contractor shall proceed with the additional or changed Work. Contractor shall document the additional or changed Work on daily LM&E sheets and submit the LM&E sheets to the PG&E on-site representative for signature at the end of each Work day. Contractor shall submit the signed LM&E sheets as required in Paragraph 9.7.4 below.

9.7. PG&E will schedule weekly meetings with Contractor. At each weekly meeting, Contractor shall provide the PG&E Project Manager an electronic and hard copy written report of progress which shall detail the Work performed the prior week, Work to be performed the following two (2) weeks, and the percentage of each task completed versus percentage of task budget expended/committed. The progress report shall clearly indicate Contractor's progress as it relates to milestone and project completion dates in Contractor's project schedule. Contractor shall update its progress report weekly and annotate any changes from the prior report which materially affect scheduled progress and adherence to budget as well as Contractor's plan for avoiding or correcting schedule delays or budget over runs.

9.7.1. No later than fourteen (14) calendar days prior to performing pressure testing, Contractor shall provide the written pressure test procedure provided for in Paragraph 16.5 below.

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- 9.7.2. Contractor's report of progress shall show the cumulative progress for the entire project.
- 9.7.3. Contractor's report of progress shall describe any safety incidents or near misses occurring during the previous week,
- 9.7.4. Contractor's report of progress shall provide a report of failed welds and information detailing the cost of such re-welds. Such information shall be the name of employee, classification, rate of pay, number of hours spent on re-weld(s), material used, and all information required in PG&E Gas Standard D-40. Contractor shall maintain a current list of all weld repairs and cutouts. The list shall provide the date the weld was made, welder identification, description of the defect, and the location of the defect. The list shall summarize each welder's defects to date and the total defects to date for the project. The report of failed welds shall include the total project weld success percentage (pass/fail percentage).
- 9.7.5. Contractor's report of progress shall provide the log of holiday testing required in Paragraph 15.10.2.3 of this Specification.
- 9.7.6. Contractor's weekly progress report shall provide a detailed description of claims for damages received or expected to be received which are or may be a result of the Work under the applicable CWA including, but not limited to, contacts resulting from the signs posted along the construction route and/or damages as described in Paragraph 5.6 of this Specification. Contractor shall provide the name of the property owner or operator, the nature of the claim, and the location and description of the property affected. Contractor shall not make commitments or payments to any property owner for resolution of any claim unless authorized, in writing, by PG&E.
- 9.7.7. At each weekly meeting, Contractor shall present to PG&E all requests for change order for additional or changed Work performed during the preceding week. Contractor's request shall provide a detailed description of the original scope of Work, the reason for the change, and the addition or reduction to cost as a result of such change. Each request for change order must include a copy of the applicable LM&E sheet, signed by the PG&E on-site representative.
 - 9.7.7.1. PG&E requires that Contractor provide notice of change to PG&E in sufficient time to enable PG&E to make safe, economic decisions concerning the project. Therefore, PG&E will not accept any request for change order later than seven (7) calendar days following the incident nor will PG&E accept any request for change order which has not been confirmed by signature of the PG&E on-site representative on the LM&E sheet detailing the addition or change.
 - 9.7.7.2. The LM&E sheet supporting Contractor's request for change order must be signed by the PG&E on-site Inspector on the date on which the additional or changed Work was performed. No change to any LM&E sheet will be accepted by PG&E unless the change to the LM&E sheet has been verified by signature of the PG&E on-site Inspector.
 - 9.7.7.3. The original LM&E sheet must accompany the applicable Contractor invoice.

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9.7.7.4. If there are no changes or additions to the Work scope, Contractor's weekly report shall include a statement, "No changes or additions for the week of (date)".

- 9.8. During the course of the Work under the CWA, if Contractor identifies any incident or circumstance which Contractor expects will impact the schedule and/or budget, Contractor shall immediately notify the PG&E Project Manager, providing a detailed description of such incident or circumstance together with Contractor's estimated impact and recommended solution. Time is of the essence.

10. PG&E GENERAL CONSTRUCTION

- 10.1. PG&E may elect to have certain Work described herein performed by PG&E's General Construction (GC) personnel.
- 10.2. PG&E anticipates that GC will perform all tie-ins to the operating natural gas transmission pipeline. PG&E will provide Contractor the scope of work for tie-in. Contractor shall provide labor and equipment as requested by PG&E to support the tie-in performed by GC. PG&E will schedule a tie-in meeting with Contractor approximately two (2) weeks prior to the anticipated date of tie-in to properly schedule GC's participation to meet project milestone and completion dates. If so requested by the PG&E Project Manager, Contractor will meet with PG&E again, closer to the date of actual tie-in, to finalize Work scope and schedule.
- 10.2.1. PG&E may amend the tie-in schedule at any time to accommodate PG&E's system operating requirements.
- 10.3. For each portion of Work Contractor anticipates retaining a subcontractor, other than the tie-in work described in Paragraph 10.2 above, subsequent to Contractor's preparation of specification for subcontract Work and prior to incorporating such Work into a request for proposal package, Contractor shall submit the specification to the PG&E Project Manager.
- 10.4. Contractor must provide each specification for subcontract Work to the PG&E Project Manager in sufficient time to ensure that in the event PG&E elects not to perform such Work, Contractor's award of such subcontract Work will be timely and will not delay the project schedule. No later than ten (10) calendar days following receipt of the specification, PG&E's Project Manager shall advise Contractor of PG&E's election to either: (i) use PG&E's GC to perform the Work, or (ii) instruct Contractor to proceed with the request-for-proposal process to subcontract the Work.
- 10.5. In the event PG&E notifies Contractor that PG&E has elected to use PG&E's GC to perform the Work, Contractor shall provide PG&E's Project Manager the following information:
- 10.5.1. Contractor's proposal price for performing the Work with its employees or subcontractors.
- 10.5.2. Required schedule for the Work including, but not limited to, Work start date, Work completion date, and required interface points with other Subcontractors and/or PG&E.

10.5.2.1. In the event PG&E disagrees with the schedule provided by Contractor, Contractor shall provide the PG&E Project Manager written documentation supporting its schedule, giving evidence that such schedule is practicable.

10.5.2.2. PG&E's GC shall complete such Work within the schedule agreed upon between Contractor and PG&E. In the event PG&E's GC does not complete such Work by the date required, PG&E shall add the number of days by which PG&E's GC has exceeded the required completion date to the completion dates required in the applicable CWA provided, however, that there is a direct relationship between such delay in completion by GC and Contractor's ability to successfully complete the Work by the required date, based upon an agreed-to schedule between Contractor and PG&E.

10.5.3. All details and material lists required to construct, install, and test the Work.

10.6. PG&E's GC may utilize its own procurement personnel to acquire necessary materials and equipment to install the Work. PG&E shall provide written documentation of all material ordered and received to accomplish the Work.

10.7. PG&E's GC will provide minimum weekly updates to Contractor's Construction Manager and PG&E's Project Manager on progress of Work with respect to agreed upon milestones, and will provide written explanation for any slippage in schedule.

11. PROCUREMENT

11.1. In the event PG&E elects to instruct Contractor to procure materials for construction, the suppliers of such materials must be PG&E's approved source(s) for such materials. Contractor shall specify segmentable fittings as applicable. The approved supplier information will be provided to Contractor with the applicable CWA.

11.2. Contractor shall be responsible for quality control with the supplier, on-site inspection of material received, and for ensuring that all material procured satisfies the requirements of PG&E Standards and the U.S. Department of Transportation 49 CFR Part 192.

11.3. For all Contractor-procured material, prior to commencing Work, Contractor shall provide all material certifications and testing documentation to the PG&E Project Manager.

12. AS-BUILT DRAWINGS

12.1. PG&E's objective for as-built information is to obtain accurate, detailed drawings and associated required documents together with GIS-quality data for all installed facilities on the project. Two forms of submittals are required for the complete as-built package - hard copy documentation and electronic GPS data.

12.1.1. Drawings

12.1.1.1. During Construction for any CWA, Contractor shall update one set of approved, signed and Released for Construction drawings DAILY with all corrected dimensions and information. Contractor shall make As-Built construction drawings available to PG&E at the jobsite at all

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times. Contractor shall maintain only one set of redline marked up drawings at the site; multiple copies are not permitted.

12.1.1.2. Correct all changes in pipeline data, dimensioning and depths including, but not limited to, all valves, corrosion protection related equipment, pipeline markers, horizontal and vertical bends, fittings and other appurtenances.

12.1.1.3. Correct all plan and profile stationing on the drawings.

12.1.1.4. Identify changes in pipe wall thickness, grade, coating and locations of test sectioning.

12.1.1.5. Identify locations of trench breakers.

12.1.1.6. Identify locations and numbers of all coupons removed from the pipeline.

12.1.1.7. For all dimensions and information that match the original design exactly, Contractor shall verify, by circling in red, the design dimension on construction drawings.

12.1.1.8. Depth of cover at existing ground elevation must be shown on the profile view at grade breaks and a maximum interval of approximately every 500 feet.

12.1.1.9. All detail sketches on the drawings must be corrected and red-lined to reflect all changes in dimension and location.

12.1.1.10. All additional separate detail sketches must be referenced on the drawings.

12.1.1.11. All appropriate information and signatures must be completed in the stamp boxes on the drawings, including the Test Data Stamp, USA Notification, Coating Selections and Weld Inspection D-40.

12.1.1.12. All weld repairs shall be identified by distance from a known point on existing pipe or other landmark/boundary that is identifiable by mapping or by GPS coordinate.

12.1.1.13. If more than one strength test is performed on the project, the test sections shall be shown on the drawings including date and test reference number.

12.1.1.14. All As-Built shall be dated and signed by the person who marked-up the drawings in accordance with the PG&E Recommended Practice document RP 4461.1.

12.1.1.15. Use the following colors for as-built information:

12.1.1.15.1. RED – Additions / Corrections

12.1.1.15.2. GREEN – Deletions

12.1.1.15.3. BLUE – Comments only.

12.1.2. Bill of Materials

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12.1.2.1. Contractor shall update all changes on the Bill of Materials including complete descriptions, specifications and quantities.

12.1.2.2. Include serial numbers and complete data plate information for all valves and other major equipment.

12.1.2.3. All material utilized on the project that was not included on the original list must be added to the Bill of Materials, including material specification.

12.1.3. Strength Test Pressure Report

12.1.3.1. It is the pipeline constructor's responsibility to perform a pressure test on each completed section of pipeline in accordance with PG&E Gas Standards A-34, A-37 and Section 16 of this Specification.

12.1.3.2. A minimum of one week (7 calendar days) prior to pressure testing, Contractor shall submit for review a location and elevation sketch for attachment to the STPR report indicating lengths by pipe size, stationing, grade and wall thickness, all installed fittings and appurtenances, elevations of high and low points on the as-installed system and location/elevation of the test point and dead weight tester.

12.1.3.3. Contractor shall ensure that a copy of the STPR and sketch are on site during the strength test and that the length tested matches length installed, that pipe specifications on the STPR match the Bill of Materials, and that the test pressure falls within the test limits with consideration of the elevation difference Static Head Calculation.

12.1.3.4. At the completion of the strength test, the associated charts and logs must be signed by the person performing the test and the test supervisor, indicating the job number, location, date, start and end time, minimum pressure, maximum pressure, test medium, the make, serial number and calibration date of the Chart Recorder and Dead Weight Tester, pipe data and lengths tested.

12.1.3.5. THE ORIGINAL STRENGTH TEST PRESSURE REPORT(S) AND ATTACHED SKETCH MUST REMAIN AT THE SITE with the Construction Manager. This report shall include the completed original charts, original dead weight log and equipment calibration documentation. Contractor shall allow sufficient time for review by the designated PG&E Pipeline Engineer prior to acceptance of the report by PG&E.

12.1.4. Permits and various documentation

12.1.4.1. All permits and forms pertinent to the project including, but not limited to, the following, shall be included in the as-built package.

12.1.4.1.1. All required encroachment permits signed off by the jurisdictional agencies.

12.1.4.1.2. Signed Property owner letters of acceptance.

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- 12.1.4.1.3. Air Quality Control Permit accreditation.
- 12.1.4.1.4. Contractor's site safety plan.
- 12.1.4.1.5. Incident Reports and Safety Notifications.
- 12.1.4.1.6. Pipe wrap sample analysis reports, if applicable.
- 12.1.4.1.7. Water and soil sample testing reports, if applicable.
- 12.1.4.1.8. Caliper Pig documentation.
- 12.1.4.1.9. Drying Records documenting the process utilized, the results, and the equipment used together with calibration information.

12.1.5. GPS Data

- 12.1.5.1. An as-built survey will collect GPS data during construction of the pipeline project to inventory features along with documenting their position and configuration. This information will be utilized in PG&E's GIS system.
- 12.1.5.2. The as-built survey contractor will provide the PG&E GIS mapping team with data in the following horizontal datum and projection: NAD 83 UTM ZONE 10 NORTH (Meters). If the data is collected in other formats, i.e., State Plane, in the boundaries of NAD 83 UTM Zone 11 North, it shall be converted to the required NAD 83 UTM ZONE 10 NORTH (Meters), because PG&E normalizes all data to Zone 10 even if in Zone 11. Elevation units to be in feet.
- 12.1.5.3. All GPS data will be provided in a .CSV tabular file, with fields accurately representing the specifications and terminology, along with NORTHING, EASTING and ELEVATION fields. The current address for data transfer delivery will be provided prior to the start of construction.
- 12.1.5.4. In the event Contractor wishes to use alternative file formats, Contractor must submit a formal request to the Pacific Gas and Electric GIS Specialist for approval, prior to the start of construction.
- 12.1.5.5. GPS data will be collected at locations where a feature change occurs in the stationing including, but not limited to, the following:
 - 12.1.5.5.1. All valves,
 - 12.1.5.5.2. horizontal angle points,
 - 12.1.5.5.3. taps,
 - 12.1.5.5.4. bore catch point locations,
 - 12.1.5.5.5. pipe wall thickness and grade changes,
 - 12.1.5.5.6. gas sampling (sniff hole) locations,
 - 12.1.5.5.7. pipeline markers,
 - 12.1.5.5.8. cathodic protection-related equipment,
 - 12.1.5.5.9. tie-in welds,
 - 12.1.5.5.10. weld repairs,

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- 12.1.5.5.11. all cut off points of pipe retired in place,
- 12.1.5.5.12. the end of any pipe stub locations, and
- 12.1.5.5.13. other relevant appurtenances.
- 12.1.5.5.14. All descriptions and attributes regarding information to establish minimum operating pressure including ANSI class, material yield strength, pipe size and wall thickness.
- 12.1.5.5.15. Serial numbers of valves and other major equipment shall be included in the attributes of the data collection.

12.1.5.6. All data submitted shall be accompanied by a supplemental information sheet in Excel format detailing the following fields that are to be filled out for every file delivered.

- 12.1.5.6.1. File Number, file name, job number, date created, the individual and company name who created the file along with a contact phone number, the projection/coordinate system and a general description of the file content.

12.1.6. Submittals

12.1.6.1. Contractor must submit a hard copy of the draft as-built drawings within seventy- two (72) hours of the project becoming operational (tied-in) for review by the Construction Manager and Pipeline Engineer.

12.1.6.2. Final PG&E-approved hard copy package – The following shall be submitted within fourteen (14) calendar days of the operational date:

- 12.1.6.2.1. A full set of final approved red-lined drawings and all the original aforementioned required documentation compiled and arranged in binder form.

- 12.1.6.2.2. Three (3) full set copies of the approved red-lined drawings.

12.1.7. Electronic GPS Data – The as-built contractor shall submit GPS data files to the PG&E GIS Specialist a minimum of three (3) times during the project. The first data delivery shall be approximately one calendar week after welding begins. The second shall be within twenty-four (24) hours of the operational date and the last at 100 percent of the job completion.

- 12.1.7.1. The GIS specialist will schedule additional data reviews on an as-needed basis. Preliminary reviews may be scheduled during the initial correspondence between the contractor and the GIS Specialist.

12.2. In the event Contractor fails, refuses or is unable, for any reason, to provide current As-Built package requirements during and after the performance of Work under a CWA, PG&E reserves the right to withhold from any payment due Contractor an amount sufficient to have such As-Built documentation and data created by others. By signature to this contract, Contractor acknowledges that As-Built are a material requirement in the performance of the work.

13. CORROSION CONTROL

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- 13.1. Contractor shall install electrolysis test stations and anodes on or with all gas transmission pipelines and services installed under any CWA under this Specification in accordance with the construction drawings and PG&E Gas Standard O-10 through O-22.1 for Corrosion Control.

13.1.1. If applicable, Contractor shall install street boxes including, but not limited to, conduit, in the sidewalk adjacent to each electrolysis test station location or as practicable unless otherwise indicated on construction drawings.

13.1.2. When installing natural gas pipeline through a metallic casing, Contractor shall verify electrical isolation between the natural gas pipeline and the casing structure.

13.1.3. Contractor shall test all corrosion control appurtenances installed by Contractor, verify proper functioning, and provide documentation of such tests to the PG&E on-site representative.

- 13.2. The OmniMetrix Pipe-to-Soil Monitor (PSM) is a self-contained wireless remote monitoring unit for pipe-to-soil and potential-to-structure CP test station measurements. The PSM monitors the reference electrode output, giving scheduled data reports and alarm notification in the event of extreme CP readings.

- 13.3. In the event the applicable CWA requires that Contractor install PSM devices, Contractor shall install such devices as follows:

13.3.1. For new transmission pipeline construction, Contractor shall install an ETS station every 2,500 feet (Type A installation as shown in Numbered Document O-10) and a coupon test station (Numbered Document O-10.2) every mile where feasible. The Remote PSM units shall be installed at each coupon test station location every mile.

13.3.2. Unless otherwise instructed within the applicable CWA, Contractor shall install the reference cell and PG&E will install the remote monitoring unit.

13.3.3. References -Gas Standard

13.3.3.1. Gas Meter Locations - J-15

13.3.3.2. Electrolysis Test Station Connection to Main - O-10

13.3.3.3. OmniMetrix PSM Wireless Pipe-to-Soil Monitor - O-10.3 (pending final approval)

13.3.3.4. Corrosion Control of Gas Facilities - O-16

13.3.4. Acronyms:

13.3.4.1. ac - alternating current amp(s) - ampere(s)

13.3.4.2. AWG - American wire gauge

13.3.4.3. CPA - cathodic protection area

13.3.4.4. HMWPE - high molecular weight polyethylene

13.3.4.5. PVC - polyvinyl chloride

13.3.4.6. CuCuSO₄ - Copper Copper Sulfate

13.3.5. Installation Procedures (Above Ground Fink Type Unit)

13.3.5.1. Before beginning installation, delineate excavation area and call USA.

13.3.5.2. Install two wire leads on the pipeline per Gas Standard O-10, Type A.

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13.3.5.3. Dig a 6-inch x 60-inch-deep hole approximately 1 foot away from the gas pipeline. Install the GMC Staperm - CuCuSO_4 Permanent Reference Electrode into hole. Add 5 gallons of water and backfill with native soil to 42 inches from top of the hole. If the GMC Staperm - CuCuSO_4 Permanent Reference Electrode has been sitting on the shelf for some time it is recommended that you pre-soak the reference in a 5-gallon bucket in fresh water for approximately 5 minutes prior to installation.

13.3.5.4. Install the 3-inch conduit in the hole, bringing the two wire leads from the pipeline and the wire from the GMC Staperm - CuCuSO_4 Permanent Reference Electrode and backfill.

13.3.6. In the event the applicable CWA instructs Contractor to install the remote monitoring unit, Contractor shall install the unit as follows:

13.3.6.1. Attach the wire leads to the OmniMetrix PSM Wireless Monitor as labeled.

13.3.6.2. Connect the OmniMetrix PSM Wireless Monitor to the 3-inch conduit and secure using the nylon screw.

13.3.6.3. Follow the initiation instructions that come with the unit and record the unit number, serial number and installed location on the carry-back card that comes with the unit.

14. PIPE HANDLING

In addition to the requirements of PG&E California Gas Transmission Guideline 4113, Contractor shall ensure that the following precautions are followed:

- 14.1. Contractor shall move the coated pipe using only non-abrasive canvas or belt slings at least ten (10) inches wide or as designated by PG&E.
- 14.2. Contractor shall ensure that coated pipe is handled carefully at all times. Contractor shall take care to prevent abrasion or scarring of the protective coating of the mainline pipes. PG&E shall have the right to approve or disapprove of the equipment and methods used in the handling and transporting of pipe and appurtenances, either bare or coated.
- 14.3. The pipe shall not be allowed to drop or roll free; nor shall it be otherwise handled in such a manner that might damage any part of the pipe section or cause distortion or deformation to the ends of the pipe.
- 14.4. Pipe sections/segments that are ten (10) feet or greater in length shall be moved forward along the pipeline alignment for inclusion in the pipeline unless otherwise directed by the PG&E on-site inspector. Contractor shall incorporate these sections/segments into its daily stringing of the pipeline.
- 14.5. Upon completion of Work, Contractor shall transport all unused materials deemed valuable by PG&E including, but not limited to, elbows and pipe sections ten (10) feet in length or greater, to the PG&E facility named in the applicable CWA. Contractor shall return material following the same procedure described in the CWA for pickup of material.

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- 14.5.1. Segments of pipe shorter than ten (10) feet shall be disposed of by Contractor. Contractor's final invoice for the project shall provide a separate line item for disposed pipe, providing a credit to PG&E for the salvage value of the pipe, less Contractor's cost of disposal.
- 14.5.2. Prior to return of pipe segments over ten (10) feet in length,, Contractor shall cut out bends, damage, and welds, re-bevel the ends and return to PG&E with the balance of the unused pipe.
- 14.5.3. Prior to removal of any material from the Work location, Contractor shall provide a written itemization of material used, material to be returned to the PG&E-designated facility, and material damaged or lost, reconciled to the Bill of Material on the PG&E approved-for-construction drawings and Contractor's as-built drawings for the project.
 - 14.5.3.1. The cost of all lost, damaged, or unaccounted-for material will be deducted from Contractor's final invoice by PG&E at PG&E's original cost to purchase such material including, but not limited to, PG&E's overhead costs to purchase.
- 14.5.4. If the applicable CWA requires that Contractor retire in place any portion of the existing pipeline as designated on the construction drawings, Contractor shall perform such Work in accordance with PG&E Work Procedure WP4100-11, Deactivation and/or Retirement of Underground Gas Facilities, and the Project Specific Information. Unless otherwise provided in the applicable CWA, Contractor shall cut the pipe to be retired at approximately 1,000-foot intervals, clean the pipe to be retired with an appropriate poly pig and capture and dispose of liquids produced by cleaning in accordance with all federal, state and local laws, rules and regulations. Contractor shall perform a gas measurement to ensure that there is no remaining combustible atmosphere inside the retired pipe and then weld steel plates on each end of each section of the pipe to be retired. As provided in Paragraph 12.1.5.5.11 of this Specification No. 13024, Contractor shall locate all cut off points of pipe retired in place on the as-builts by GPS.

15. FABRICATION OF STEEL PIPELINES

15.1. Angles

- 15.1.1. Contractor shall ensure that all angles, either horizontal or vertical, and roping, conform to radii shown on Construction Drawings and are made in accordance with PG&E Gas Standard A-36.
- 15.1.2. In no event will Contractor use miter welds for any angle in the construction of the pipeline.
- 15.1.3. In the event Contractor recommends the use of field bends for any angles in the construction of the pipeline, Contractor shall submit the location and angle of such to the PG&E on-site representative. Contractor shall not proceed with such field bends until authorized by PG&E. In the event Contractor receives such authorization from PG&E, Contractor shall proceed in accordance with PG&E Gas Standard A-36.

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15.1.4. All welding elbows shall be made available in forty-five (45) or ninety- (90) degree segments. Contractor shall cut/prep the PG&E-supplied elbows to Contractor's field-verified angles at no additional charge to PG&E. To maximize the use of welding elbows, Contractor shall cut multiple angles from an elbow by cutting from one factory bevel toward the opposite factory bevel. In the event Contractor cuts a fitting from both ends and the fitting is deemed usable by PG&E, Contractor will be invoiced by PG&E for the lost number of degrees at the original cost to PG&E for the fitting.

15.1.5. When angles are formed by segments of welding elbows, the angles shall be torch cut with a beveling machine, and ground. Segments shall be a minimum of two (2) inches from top-of-bevel to top-of-bevel at the throat of the segment. Segmenting of fittings shall be in accordance with PG&E Gas Standard B-25.

15.1.6. PG&E will advise and verify all angles for tie-in pieces.

15.2. Pipe Bevels

15.2.1. Contractor shall re-cut and bevel all pipe ends as may be necessary to maintain correct alignment of the pipeline. PG&E shall not be charged for such re-cutting or re-beveling.

15.2.2. Contractor shall make all pipe bevels with a beveling machine; hand beveling will not be permitted. All field bevels shall be cut and finished at right angles to the longitudinal axis of the pipe evenly and without rough surfaces. A power-driven grinder and/or wire buffer shall be used to finish the cut to a bevel and face identical to the original.

15.3. Pipe Wrap Removal

15.3.1. In addition to the requirements of PG&E California Gas Transmission Guideline 4711, Contractor shall not burn wrap off of pipe. Wrap shall either be cut, chipped, scraped or peeled. Torch cleaning of remaining residue is only appropriate preparatory to a welding operation.

15.3.2. When asbestos is thought to be present in existing pipe wrap, Contractor shall coordinate with the PG&E on-site representative to obtain and test a sample of the pipe wrap. Contractor shall provide for time to obtain results of test of pipe wrap in Contractor's project schedule.

15.4. Gouges

15.4.1. Contractor shall ensure that laminated pipe or sections of pipe with gouges or grooves of a depth of eight (8) percent or more of the pipe wall thickness are removed as a cylinder and replaced with undamaged sections of pipe. Gouges or grooves which are less than eight (8) percent of the wall thickness shall be ground out. Grinding shall be done to feather out the areas of reduced thickness approximately one (1) inch wider than the actual gouges or groove. The above defects are not to be repaired by welding. The final pipe wall thickness shall be checked and accepted by PG&E. PG&E's acceptance does not relieve Contractor of the responsibility to perform and warrant the Work as provided herein.

15.5. Pipeline Placement

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- 15.5.1. Contractor shall carefully place pipeline sections in a manner approved by PG&E. All pipe shall naturally conform to the trench contours. Under no circumstances shall pipe or pipeline sections be dropped, jacked, or forced into position.
- 15.5.2. In the event the pipeline does not properly fit the trench as specified herein, Contractor shall remove the pipe and make the necessary corrections to either the trench width or grade and/or pipeline alignment.
- 15.5.3. Prior to any section of pipeline being lowered into a trench, the welds shall be completed. Any welds left overnight or subjected to any strain shall have a minimum of three weld passes completed. A backweld is considered one pass.
- 15.5.4. Pipe that has been Jeeped and lowered into the trench shall have a minimum backfill cover to protect against wrap damage at the end of the shift.
 - 15.5.4.1. Any string of pipe that touches the side of the trench during installation shall be removed and re-Jeeped.
 - 15.5.4.2. Contractor shall test and calibrate the HSHD no less frequently than twice daily and submit the results to the PG&E on-site Inspector for verification. The PG&E Inspector shall verify by signature to the calibration document(s).
 - 15.5.4.3. PG&E may elect to perform a DCVG. If use of DCVG detects anomalies, Contractor must expose and repair such anomalies.
- 15.6. Alignment
 - 15.6.1. Contractor shall ensure that the alignments of pipelines are verified by PG&E prior to placing of backfill. Any costs incurred from realignment resulting from Contractor's inaccurate fabrication will be the responsibility of Contractor.
 - 15.6.2. Alignment of pipe shall allow a minimum of six (6) inches between the pipe and trench wall. Shading material shall be placed six (6) inches around the entire circumference of the pipeline except top cover which shall be twelve (12) inches in accordance with Paragraph 19.2. below.
- 15.7. Welding Steel Pipe
 - 15.7.1. Contractor shall maintain, on the welding rig being used to perform any welding hereunder, a copy of the applicable welding procedure provided to Contractor with the applicable CWA, wind meter, temp stick, water-proof marker, and an amp gauge.
 - 15.7.2. All coupons removed from the pipeline by cutting with a torch or drilling machine shall be numbered, labeled and retained for the duration of the project. All coupons shall be given to the PG&E on-site representative prior to pressure testing.
 - 15.7.3. All weld cutouts shall be delivered to the PG&E Inspector's office within eight (8) hours of the removal. The cutout shall have six (6) inches of pipe on each

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side of the defective weld and shall be marked with the location of the removal, welder identification number, and the defect.

15.7.4. If applicable, Contractor shall weld all sacrificial pipe to adequately handle the stresses and strains of the boring operation. Contractor shall take full responsibility for bore failures due to the insufficient or improper welding of the sacrificial pipe.

15.7.5. Contractor's welders must be certified in accordance with Paragraph 8.2 of this Specification prior to performing any Work under this Contract. Contractor warrants that all field joints in the pipeline are welded, including fittings and accessories, according to the applicable PG&E Gas Standard, and that all welding equals or exceeds the requirements of API Standard 1104, most current edition, "A Standard for Field Welding of Pipelines".

15.7.5.1. Contractor shall ensure that all welds are marked with a waterproof crayon by the welders, with the numbers assigned to them by PG&E. Should any welder leave the job, his/her number will not be duplicated. No punch or steel stenciling will be permitted.

15.7.6. Contractor shall ensure that the pipe is properly aligned with ends square with the pipe axis prior to welding. No misalignment of the pipe will be allowed. In no event will Contractor use backwelding to compensate for poor alignment of the main line pipe.

15.7.7. Contractor shall ensure that no welding electrodes or ground connections are permitted to arc on the pipeline except in the joint groove to be welded. Any such arc burn shall be considered a defect and shall be removed.

15.7.8. Contractor shall ensure that welding is not done when the weather conditions are unfit or would impair the quality of the completed weld, as determined by PG&E. When necessary, Contractor shall provide and use a cover of a type that will give adequate protection to the welder, and the weld, from the weather. Contractor shall furnish and install anchored windshields to protect welding when the winds exceed fifteen (15) miles per hour or as required by the PG&E on-site representative.

15.7.9. Contractor shall provide a fully charged fire extinguisher for immediate availability at each location where welding or cutting is to be done.

15.7.10. Where applicable, Contractor shall comply with United States Department of Forestry rules for fire control.

15.7.11. Contractor shall utilize shields or screens, to be approved by PG&E, to protect pedestrians, residents and others from exposure to ultraviolet light resulting from arc welding.

15.7.12. Contractor shall not throw waste electrodes and/or electrode stubs into the trench, pipe, or backfill material.

15.8. Testing of Welds

15.8.1. PG&E will visually inspect and radiographically test all welds according to PG&E Gas Standards D-33 and D-40, to ensure that the standard of acceptability

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for all welding equals or exceeds the requirements of API Standard 1104, 18th Edition, "A Standard for Field Welding of Pipelines". All radiographic films shall be the property of PG&E and all documents required by API 1104 and PG&E Gas Standard D-33 shall be submitted to PG&E.

15.8.2. Each Work day Contractor's Construction Superintendent will advise the PG&E on-site Chief Inspector of when and how many x-rays will need to be performed the following day.

15.8.2.1. In the event Contractor fails to meet Contractor's schedule for x-rays and if the x-ray contractor is required to wait two (2) hours or more for Contractor to be ready for x-ray, then Contractor shall pay for the x-ray contractor stand-by time which is in excess of two (2) hours. PG&E will not be invoiced for the cost of any Work delay caused by any inadequacy in Contractor's x-ray schedule provided to PG&E the previous business day.

15.8.2.2. Contractor shall pay the cost of radiographic testing of welds that fail initial testing by PG&E.

15.8.2.3. The interpretation of the radiographic films shall be evaluated by PG&E on the basis of API 1104, 18th Edition. Final weld acceptance or rejection will be by PG&E; however, such acceptance or rejection shall not relieve Contractor of the sole responsibility to perform and warrant the Work in accordance with this Contract.

15.8.2.4. Unless otherwise elected by PG&E, radiographer's source shall have minimum source strength of 65 curies at all times.

15.8.2.5. Contractor shall provide safe and convenient access to each weld for radiographic examination.

15.8.2.6. Contractor shall provide traffic control, barricades, or any other means determined to be necessary by PG&E, in order to protect residents, pedestrians and others from radiation exposure due to radiographic inspection.

15.8.2.7. Contractor shall re-weld each weld which is not satisfactory according to the x-ray examination. No more than one attempt to repair a failed weld will be allowed. If the failed weld is not satisfactorily repaired at the first attempt, it must be removed from the pipeline. Contractor shall not be allowed schedule relief to re-weld any such failed weld. Contractor shall re-weld the failed weld at no additional cost to PG&E.

15.8.2.8. When the results of welding inspections show a welder is not producing satisfactory field welds, he or she will not be permitted to continue welding on the pipeline. At PG&E's request, Contractor shall remove that welder from Work performed under this Contract, in accordance with the terms of Paragraph 8.4 above.

15.8.2.9. At PG&E's expense, PG&E reserves the right to employ any other nondestructive method of testing, such as radiographic examining, magnetic particle testing, ultrasonic testing and/or other acceptable methods.

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15.8.2.10. As required in Paragraph 9.7.1, Contractor shall provide a weekly report of failed welds.

15.9. Night Caps

15.9.1. Contractor shall ensure that open ends of pipe segments are securely sealed at the end of each day, with PG&E-approved devices, to prevent entrance of water, trash, small animals, or other objects. These seals shall not be removed until Work is to be resumed. These covers shall not be tack welded to the pipe.

15.10. Protective Coatings

15.10.1. In addition to bored pipe, Contractor shall apply protective coatings to all metallic field joints, fittings, and any other bare metal surfaces, and shall repair coatings on existing pipe and appurtenances where protective coating is damaged or has been removed during Work connected with this project. The protective coatings shall be applied in accordance with PG&E Gas Standard E-25, PG&E Gas Standard E-30, and PG&E Gas Standard E-35. The field coating on bare pipe and/or damaged wrap shall be considered a normal part of the pipeline installation, and shall be the sole responsibility of Contractor.

15.10.2. Contractor shall ensure that the applicable employees have received appropriate training in the application of coatings specified in the CWA. Contractor shall arrange for the vendor to provide the training and shall advise the PG&E on-site representative of the date, time and location for the training. Contractor shall provide the PG&E on-site representative documentation of the training provided and the names of the employees so trained.

15.10.3. Prior to placement in the trench, all portions of the coated pipe, both field and plant wrapping, shall be inspected by Contractor with a PG&E-approved holiday detector ("Jeep"). The holiday detector shall be provided by Contractor. Contractor will have manufacturer's instructions and calibration data for each holiday detector on site at the location where the equipment is being used. All equipment is to be used in accordance with the manufacturer's instructions and industry standards. Contractor will submit verification of proper calibration prior to start of project, will test the holiday detector to ensure accurate function prior to each use, and will submit documentation of each such test to the PG&E on-site representative. For fusion-bonded epoxy (FBE)-coated pipe, the voltage shall be 125 volts per mil of coating thickness.

15.10.3.1. Contractor shall ensure that a PG&E representative is present during the holiday detection process.

15.10.3.2. Any pipe that does not have a minimal cover at the end of the day shall be re-jeeped by Contractor prior to backfilling the following day.

15.10.3.3. When the testing circuit utilizes the earth, Contractor shall ensure that the proper voltages are being obtained at the coil/pipe interface and that the voltages are not being diminished by long distances of highly resistive soil. A PG&E Inspector may require additional testing of the coating prior to lowering pipe into trench if damage is suspected. Any defects disclosed by these tests, including

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places where the plant-applied coating has been damaged by resting on skids or other causes, shall be repaired by Contractor at no additional cost to PG&E. If pipe touches the side of ditch during lowering, it shall be removed from ditch and retested. All coating repairs are to be made utilizing a PG&E-approved method and in accordance with all applicable PG&E standards and procedures. The repaired pipe will be reexamined with the holiday detector after the repair has cured.

- 15.10.3.4. Contractor shall develop a log of all holiday testing and submit this log to the PG&E Project Manager at the weekly meeting. The log shall include calibration documentation, daily entries for the pipe tested including station numbers, holidays discovered and documentation of successful tests and coating repairs.

16. PRESSURE TESTING

- 16.1. As provided by Paragraph 15.7.2 of this Specification, prior to performing any pressure test, Contractor shall provide all coupons removed from the pipeline to the PG&E on-site representative.
- 16.1.1. Contractor shall number all coupons removed from the pipeline and the locations, with numbers shown, shall be indicated on the as-built drawings.
- 16.2. Contractor shall provide storage tanks, pumps and all necessary hard piping required to perform the test. All materials and equipment utilized by Contractor for the pressure test including, but not limited to, hoses, pumps, and meters, shall be clean and in a condition to avoid contamination of hydrotest water.
- 16.3. Unless otherwise required in the applicable CWA, Contractor shall acquire the water source and discharge location for the hydrotest water.
- 16.4. Unless otherwise specified in the applicable CWA, PG&E will test the hydrotest water prior to and after the hydrotest. Contractor shall not dispose of the hydrotest water until authorized to do so by PG&E. PG&E's acceptance of the results of the water test does not relieve Contractor of the responsibility to manage the hydrotest water in accordance with all permits and regulations.
- 16.5. As provided by Paragraph 9.7 of this Specification, Contractor shall provide a detailed test procedure to the PG&E Project Manager no later than fourteen (14) calendar days prior to the planned test. Contractor's test procedure must be approved by PG&E prior to Contractor commencing Work; however, such approval shall not relieve Contractor of the responsibility to perform and warrant the Work as provided herein.
- 16.5.1. Upon receipt of Contractor's test procedure, PG&E will complete Part I of the Strength Test Pressure Report, a sample of which is attached to this Specification as Exhibit 2, and provide the partially completed form to Contractor.
- 16.6. Contractor's test procedure shall include all procedures required by PG&E Gas Standards A-34 and A-37 including, but not limited to, each of the following:
- 16.6.1. Names and qualifications of subcontractors, if any.
- 16.6.2. Contractor's schedule and process to accomplish the pressure testing of the installed pipe.

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- 16.6.3. Contractor's planned means to acquire, store, filter and dispose of the test water, if applicable.
- 16.6.4. Contractor shall ensure that all pipe to be tested is firmly supported prior to filling with water. Maximum span lengths between supports shall be fourteen (14) feet, and the maximum cantilevered span shall be ten (10) feet.
- 16.6.5. Test pressure shall be as shown on approved Strength Test Pressure Report and, unless otherwise directed by PG&E, held for a minimum period of eight (8) hours or, on bridges, a minimum of twenty-four (24) hours.
- 16.7. Contractor shall supply all required test instruments including, but not limited to, dead weight testers at both ends of the hydro test section, spring gauge, temperature and pressure recorders with charts, recording gauge and test chart. Contractor shall calibrate all instruments prior to the test and provide the calibration certifications to the PG&E on-site representative prior to conducting the test.
- 16.8. Contractor shall perform a pressure test on each completed pipeline section in accordance with PG&E Gas Standards A-34 and A-37.
 - 16.8.1. For pipe to be installed by horizontal directional drill, Contractor shall pressure test such pipe as a section prior to pulling the pipe through the bore
 - 16.8.2. Contractor shall complete Part II of the Strength Test Pressure Report, Part I of which was previously completed by PG&E, and provide the test charts and completed Strength Test Pressure Report to the PG&E on-site representative no later than two (2) hours following completion of the test.
 - 16.8.3. Test records shall be signed and dated by the PG&E Representative upon witnessing and verifying said test. Upon completion of any test, all records shall become the property of PG&E.
 - 16.8.3.1. In addition to other requirements, Contractor shall comply with all requirements of Paragraph 12.1.3 and other applicable portions of Section 12 of this Specification. As required in 12.1.3.5, the original strength test pressure report(s) and attached sketch must remain at the site with the Construction Manager.
 - 16.8.4. Immediately following the hydrotest, Contractor shall perform a caliper pig run of the newly-installed pipeline to detect dents, abnormalities and ovality. Contractor shall prepare, load, launch, run, and retrieve the caliper pig. Unacceptable pipe abnormalities shall be determined according to the requirements of API Specification 5L, 44th Edition. Pipe sections with unacceptable defects must be removed and replaced. The cost for such replacement shall not qualify as a Change Order and shall be included in Contractor's actual cost to construct the project and, if applicable, prior to calculation of incentive payment due Contractor, if any, as described in the Cost Reimbursable Compensation Structure attached to the Project Specific Conditions.
- 16.9. Other than pressure testing of headers, regulating stations, meter sets or prefabricated valve assemblies, if Contractor recommends pressure testing of a portion of the completed pipeline be performed using other than water, Contractor shall provide PG&E written

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documentation of its reason for such recommendation. Contractor shall not proceed with any pressure test using anything other than water unless specifically authorized, in writing, by PG&E. If PG&E authorizes any portion of the pressure test be performed using other than water, PG&E will provide Contractor the specification for such test with the written authorization to proceed.

- 16.10. No portion of Contractor's test head or manifold shall be pressured over 72 percent SMYS during the testing of any PG&E facilities. PG&E will review Contractor's documentation for the test equipment and examine Contractor's test equipment for condition. PG&E's inspection or acceptance of Contractor's documentation or equipment shall not relieve Contractor of the responsibility to perform and warrant the Work performed.

- 16.11. If a tested section fails to maintain the specified test pressure, Contractor shall determine the location of the leakage or failure. Contractor shall remove the defective section and install, with new material, a replacement section prior to reinitiating the test and the section shall be re-tested in its entirety, all at no additional cost to PG&E. The defective section shall remain the property of PG&E.

16.11.1. Contractor shall be liable for any additional costs including, but not limited to, damages, repair, re-testing or investigation arising from failures under testing due to defective workmanship and/or materials furnished by the Contractor.

16.12. Water Removal

16.12.1. After each pipeline section is successfully tested, Contractor shall remove all moisture from pressure testing water using a pipeline pig of good condition. Contractor shall drive the pipeline pig, using compressed air, back and forth through the pipeline section as many times as necessary to ensure that all moisture from hydrostatic pressure testing water is removed. The pipeline shall be dried to a dew point of -40°F. This shall be verified by the use of a calibrated dew point tester. Prior to performing the verification, Contractor shall provide calibration documentation to the PG&E on-site inspector. The PG&E on-site inspector must witness the verification.

16.12.2. Contractor shall release hydrostatic pressure testing water in a controlled manner and in accordance with all permits from jurisdictional agencies and PG&E requirements.

16.13. Capping

16.13.1. After the pipeline section is tested and all moisture is removed, Contractor shall cap the section ends sufficient to ensure no foreign material or water can enter the tested section. After capping, Contractor shall not perform any maintenance or further work on the facilities without the express written permission of PG&E.

17. PIPE INSTALLATION

17.1. Excavation

17.1.1. Excavation requirements in this Section shall apply to both trenching and boring work, as appropriate.

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- 17.1.2. Contractor shall offset centerline marks and stakes and set the proposed cut marks per construction drawings. Contractor shall maintain offset centerline marks and stakes throughout the duration of the Work under the applicable CWA.
- 17.1.3. Contractor shall clear and haul away all vegetation and debris, including concrete rubble, from the right of way by blading, diskking, or any other operation necessary, prior to excavation.
 - 17.1.3.1. As topsoil is removed from the right of way, Contractor shall stockpile such topsoil separate from other trench spoil. Contractor shall replace the topsoil in the trench at its original grade level during backfilling operations. Contractor shall avoid contamination of the topsoil.
 - 17.1.3.2. Contractor shall take all necessary precautions to avoid damage to trees and shrubs, including roots.
- 17.1.4. Prior to excavation, Contractor shall prospect for the location and depth of cover for all existing substructures that are marked or anticipated that may interfere with the installation of the pipe.
 - 17.1.4.1. Where a pipeline approaches and crosses other underground utilities or substructures including, but not limited to, sewers, water mains, and telephone conduits, Contractor shall modify the centerline, as needed, so that the pipeline may be installed with at least eighteen (18) inches of free horizontal and vertical clearances between the utility line being crossed, as well as maintaining the minimum cover on the pipeline being installed. If greater separation distances are required by governmental, public utility regulations, and/or specified on the construction drawings, Contractor shall install the pipeline at the greater separation requirement. Any modifications must be approved by PG&E prior to excavation.
- 17.1.5. Contractor shall excavate trenches and bell holes as necessary to install the pipelines according to the centerlines as shown on construction drawings. PG&E will not constrain Contractor to excavation sizes shown on construction drawings. Any pipeline centerline deviations must be approved by PG&E prior to excavation.
 - 17.1.5.1. At tie-in locations, Contractor shall excavate a bell hole for performance of tie-in operations. The minimum dimensions of the bell hole working space shall be three (3) feet wide on each side of the pipeline, by six (6) feet long from each side of the tie-in weld location, and eighteen (18) inches below the bottom of the pipeline.
 - 17.1.5.2. For each tie-in, Contractor shall excavate, wrap, backfill and compact sniff holes at each gas source location.
 - 17.1.5.3. Contractor shall excavate trenches, bell holes and sniff holes so that adequate room is provided for the performance of all Work and shoring and/or sloping as required within CAL/OSHA safety standards.

- 17.1.6. Unless otherwise specified on plans and/or permits, Contractor shall ensure that the depth of excavation provides for a minimum of forty-eight (48) inches of radial cover on the pipes, measured from finished grade.
- 17.1.7. Contractor shall ensure that the width of trenches is at least twelve (12) inches greater than the outside diameter of the pipe being installed so that 1) all the facilities may be installed without damage, and 2) sufficient space is provided for the placement and compaction of backfill material.
- 17.1.8. Contractor shall ensure that the bottoms of excavations are level, flat, without surface irregularities, and cleared of rocks or other debris. Trench elevation changes shall be by gradual transition and not by abrupt drops. At vertical angles, Contractor shall ensure that the trench bottom is formed, relieved and padded to fit the curvature of the pipeline.
- 17.1.9. Contractor shall place a minimum of six (6) inches of sand padding in the bottom of all excavations for placement of facilities. Contractor shall ensure that padding and padding material are in accordance with Paragraphs 15.6.2 and 19.2.
- 17.1.10. Shoring: Contractor shall furnish and install shoring as required by CAL/OSHA regulations and any additional shoring and bracing as needed to support any excavation in a safe and stable condition. All shoring shall be removed by Contractor after use.
- 17.1.11. Water Control: Contractor shall perform all Work necessary for the control and disposal of all surface and subterranean water to the extent and for such time as is necessary to keep water from interfering with the progress, efficiency, and quality of Work. If inclement weather or the presence of groundwater causes any excavation to fail or fill with water, it is Contractor's responsibility to do whatever is necessary to promptly restore the excavation to an acceptable condition and the facilities to their appropriate configuration, acceptable to PG&E, without any additional cost to PG&E. PG&E's acceptance shall not relieve Contractor of the responsibility to maintain a safe, efficient Work site and to perform and warrant the Work as provided herein.
 - 17.1.11.1. If designated in the construction drawings, Contractor shall furnish and install weights on the previously installed pipeline to counteract buoyancy.
 - 17.1.11.2. To remove sediment prior to discharging, Contractor shall route water through a control measure such as a sediment trap, sediment basin, water storage tank, or other measure approved by PG&E and all jurisdictional agencies. After removing sediment, Contractor shall transport and dispose of all water in accordance with all permits and federal, state or local regulatory requirements at no additional cost to PG&E.
- 17.1.12. Erosion Control: Contractor shall install all temporary and permanent materials necessary to mitigate potential erosion. All installations shall be in accordance with industry standards and specific designs in the construction drawings. In the event the installation of such erosion control may adversely affect adjacent property, Contractor shall so notify the PG&E Project Manager, providing Contractor's recommended alternative method of erosion control. Nothing

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contained herein shall relieve Contractor of the responsibility to avoid damage to adjacent property.

17.1.12.1. Silt barricades shall be installed to prevent project area runoff into any drainage channels.

17.1.12.2. Trench plugs shall be installed in the trench where the possibility of trench line erosion exists. Trench plugs shall be a minimum of five (5) feet away from the start of any sag or over bend. Trench plugs will be fabricated from non-organic sand bags in accordance with details shown in the drawings. Trench plugs shall be keyed into the trench wall no less than ten (10) inches.

17.1.12.3. Water bars shall be installed over the pipeline to direct water away from the trench line. Unless otherwise specified in the construction drawings or by governing authority, water bar spacing shall be as follows:

<u>Average Slope Grade</u>	<u>Bar Spacing</u>
1% to 5%	150 feet
6% to 15%	100 feet
16% to 25%	50 feet
>25%	25 feet

17.1.13. Contaminated Soil: If contaminated soil is encountered during trenching or boring, Contractor shall immediately stop work and notify the PG&E Representative in accordance with Section 6 of this Specification. Contractor shall take such additional steps as may be appropriate under the circumstances to protect the safety of the public and of the crews of Contractor and other contractors working in the area.

17.1.14. Excavation Maintenance: During the performance of Work, Contractor shall be responsible for maintaining the excavations in satisfactory condition.

18. BORING AND/OR TUNNELING

18.1. Contractor shall submit a boring plan with the proposal for PG&E's review. The boring plan shall include, but not be limited to, drawing(s) and narrative description of the angles, depth, and exact location of the exit ditch. The boring plan shall also show the depth of the bore at the low point. PG&E's review and acceptance of Contractor's boring plan shall not relieve Contractor of the responsibility to perform and warrant the Work as provided herein.

18.1.1. Attached hereto and incorporated herein by this reference is Horizontal Directional Drill Specification. The requirements of the Horizontal Directional Drill Specification are in addition to, not in lieu of, all of the terms and conditions contained in this Specification No. 13024 and the applicable CWA. In the event of conflict, the most stringent requirement shall prevail. If Contractor determines that a conflict exists, Contractor shall immediately contact the PG&E Project Manager, describing the nature of the conflict. Contractor shall not proceed to perform the Work affected by the conflict until Contractor has been instructed on resolution of the conflict by the PG&E Project Manager.

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- 18.2. Contractor shall mark the centerline of the bores. Any pipeline centerline deviation in excess of three feet laterally must be approved by PG&E prior to boring.
- 18.2.1. Contractor shall continually monitor the three-dimensional location of the bore. Contractor shall drill for the pipelines according to the centerlines as shown on construction drawings.
- 18.3. Contractor shall ensure that all excavations and shoring provided and installed by Contractor allow adequate room for the performance of Work and to ensure the safety of Contractor's employees within CAL/OSHA safety standards. Contractor shall notify the PG&E designated on-site representative if any excavation or shoring is to be modified, removed, or added.
- 18.4. Contractor shall provide power grouting necessary due to settlement including, but not limited to, filling voids resulting from pipe removal.
- 18.5. Contractor shall be responsible for removing all boring spoils and ensuring that the bottoms of excavations are kept level, flat, without surface irregularities, and cleared of large rocks or other debris.
- 18.6. Contractor shall provide all necessary de-watering systems including the design of such systems.
- 18.7. Contractor shall dispose of waste material generated through the boring process including, but not limited to, drilling fluids, at a suitable disposal site in accordance with all federal, state and local laws, rules and regulations, and the cost of such disposal shall be included in Contractor's proposal.
- 18.8. Boring Contact
- 18.8.1. If Contractor meets resistance during boring, or suspects possible contact with an existing substructure or other obstruction which could cause abrasion, scarring or other damage to the pipe, Contractor shall immediately stop boring and notify the PG&E designated on-site representative of the possible obstruction. Contractor shall not continue boring until Contractor and PG&E have reached agreement as to resolution of the problem.
- 18.9. Bore Hole Abandonment:
- 18.9.1. In the event Contractor cannot successfully complete a bore, Contractor shall remove any pipe installed (if possible), abandon the incomplete bore hole and any pipe that cannot be removed, and fill the abandoned hole and pipe with grout.
- 18.9.2. Payment in the Event of Bore Failure
- 18.9.2.1. In the event Contractor is unable to cross the obstacle and Contractor's monitoring tool(s) has documented that the bore has deviated in excess of the requirement or has exceeded the minimum roping radius as defined in the construction drawings and/or Contractor has failed, refused or been unable, for any reason, to handle the pipe in accordance with all approved methods, and/or Contractor's weld(s) has failed, and/or Contractor has not taken reasonable precautions in the performance and analysis of soil bores, then Contractor shall plug and

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abandon the bore as described above, clean and vacate the Work site, and PG&E shall not be liable to Contractor for any payment for the failed bore.

18.9.2.2. In the event Contractor is unable to cross the obstacle and Contractor has, in PG&E's sole judgment, documented through its monitoring tool(s) that the bore has not deviated in excess of the requirement and has not exceeded the minimum roping radius as defined in the construction drawings, Contractor has handled the pipe in accordance with all approved methods, no weld by Contractor has failed and Contractor has taken reasonable precautions in the performance and analysis of soil bores, then Contractor shall plug and abandon the bore as described above, clean and vacate the Work site, and Contractor shall invoice PG&E for Contractor's mobilization/demobilization of Contractor's drilling equipment to and from the jobsite as quoted in Contractor's proposal in response to the applicable CWA.

18.9.3. Micro tunnel

18.9.3.1. PG&E anticipates that Contractor will require a maximum of five and one-half (5.5) hours to weld, x-ray, and coat each joint of mainline pipe for installation of each pipe section by micro tunnel. In the event Contractor's required time is materially different from that anticipated by PG&E, Contractor shall so indicate in its boring plan.

18.9.3.2. Contractor shall construct backstops as required to support and stabilize the tunneling and pipe-pushing equipment and bore pits for the entry and exit of the pipe for the micro tunnel installation. Contractor shall maintain the backstops and bore pits during the Work under the applicable CWA including, but not limited to, modifications to depth, width, height and shoring. Contractor shall construct the backstop within PG&E's right of way described in the applicable CWA.

18.9.3.3. Contractor shall cut, align, and weld the entire length of each of the mainline pipes in sections of the length designated in construction drawings, apply protective coatings to field joints, and handle the welded pipe sections for installation by the micro tunnel equipment.

18.9.3.4. Contractor will push each welded section across the length of the micro tunnel bore until the leading end of the pipe is a minimum of ten (10) feet beyond the end of the bore to permit Contractor to inspect the protective coating. In the event the coating has been damaged, Contractor shall repair the coating and continue to push the pipe until no defects are found.

18.9.4. Horizontal Directional Drilling

18.9.4.1. Prior to commencing the HDD, for the pipe to be installed by HDD, Contractor shall provide a written detailed draft construction plan to the PG&E Project Manager, indicating the proposed methods for installation, hydrostatic testing and drying, and a description of the boring equipment and tools.

- 18.9.4.1.1. Contractor's draft construction plan shall include a detailed draft drilling fluid formula and frac-out plan including, but not limited to, MSDS for all mud mixes and fluid additives, containment ponds as required and drilling fluid disposal procedures.
- 18.9.4.2. Prior to commencing the HDD, Contractor shall schedule a meeting with PG&E for final review of the soils report. At a minimum, the meeting shall be attended by the PG&E on-site inspector, the HDD crew, the support crew and the geotech representative. If the soils report has been provided by PG&E, the report is provided as information only and PG&E does not warrant the accuracy or applicability of the results. Contractor shall determine to its own satisfaction the conditions affecting the HDD.
- 18.9.4.3. In the event any portion of the bore is to be invoiced to PG&E on a unit cost basis, the length of the bore shall be measured on the surface, from entry tie-in point to exit tie-in point.
- 18.9.4.4. Contractor shall construct a deadman as required to support and stabilize the drilling and pipe-pulling equipment. Contractor shall maintain the deadman and bore pits during the Work under the applicable CWA including, but not limited to, modifications to depth, width, height and shoring. Contractor shall construct the deadman within PG&E's right of way described in the applicable CWA. If a tail ditch is required, Contractor shall provide to PG&E, with the boring plan, the depth, width, height and shoring requirements for Contractor's tail ditch. During the performance of Work, Contractor shall maintain the tail ditch to ensure the safety of Contractor's employees.
- 18.9.4.5. Contractor shall horizontal directional drill for the gas transmission pipeline in accordance with the approved boring plan. In the event more than one gas transmission pipeline is to be installed, Contractor must complete the drilling and installation in the order designated in the applicable CWA.
- 18.9.4.6. At all times during the boring operation, Contractor shall provide the services of a drilling fluid engineer, on site, to analyze the drilling fluid.
- 18.9.4.6.1. Contractor shall maximize recirculation of drilling fluid surface returns. Contractor shall provide solids control and fluid cleaning equipment of a configuration and capacity that can process surface returns and produce drilling fluid suitable for reuse.
- 18.9.4.6.2. Contractor shall containerize and segregate drilling fluids from native soil. Contractor shall not allow drilling fluids to migrate onto the soil. Contractor shall transport and dispose of the drilling fluids as necessary to avoid any overflow of such fluids onto the site.
- 18.9.4.7. Contractor shall at all times provide and maintain instrumentation which will accurately locate the pilot hole, measure drill string axial and torsional loads, and measure drilling fluid discharge rate and pressure.

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Contractor shall maintain these instruments and their readings at the job site and available to the PG&E Inspector at all times during performance of the Work hereunder.

18.9.4.7.1. Entry Point Location – The pilot hole shall initially penetrate the ground surface at the exact location shown on the construction drawings.

18.9.4.7.2. Exit Point Location – The pilot hole shall finally penetrate the ground surface within plus or minus 10 feet of the alignment shown on the construction drawings and within plus 50 feet and minus 0 feet of the length shown on the drawings.

18.9.4.7.3. The pilot hole shall be drilled along the path shown on the construction drawings to the tolerances listed below:

18.9.4.7.3.1. Elevation – plus 0 feet, minus 30 feet.

18.9.4.7.3.2. Alignment – plus or minus 10 feet.

18.9.4.8. Contractor shall provide rollers adequate in number, type and strength to support the entire length of pipeline of the size specified in the applicable CWA. The length of each size of pipe specified in the CWA shall be increased to include required sacrificial pipe.

18.9.4.9. Contractor shall perform the cutting, aligning, and joining of the entire length of each of the mainline pipes and sacrificial pipe and apply protective coatings to mainline pipe and field joints to allow Contractor to make one continuous pull of each pipe.

18.9.4.10. Contractor shall place such pipe on the rollers provided by Contractor. PG&E may elect to provide standby equipment to assist in guiding the pipe. Such assistance by PG&E does not relieve Contractor of the responsibility to ensure that the rollers are adequate and spaced properly and for the smooth, continuous, efficient pull of the pipe.

18.9.4.11. Contractor shall jeep the HDD pipe prior to installation. The pipe shall be Jeoped after leaving the last roller and prior to entering the ground.

18.9.4.12. As provided in Paragraph 16.8 of this Specification, Contractor shall hydrotest the HDD pipe prior to installation in the bore.

18.9.4.13. Contractor shall utilize a swivel to connect the pull section to the reaming assembly to minimize torsional stress imposed on the section.

18.9.4.14. Contractor shall pull the entire length of welded transmission pipe back through the completed bore. In the event any portion of such welded pipe should fail during Contractor's pull of the pipe, such pipe failure shall be considered a bore failure and Contractor shall plug and abandon the bore in accordance with Paragraph 18.9.

18.9.4.14.1. Contractor shall install the pull section in the reamed hole in such a manner as to ensure that external pressures are minimized and an appropriate counter-balancing internal pressure is maintained. In the event the pipe is damaged as a result of external pressure during installation, Contractor shall repair such damage at no additional cost to PG&E.

18.9.4.15. Contractor will cut, remove, and dispose of the sacrificial pipe as necessary.

18.9.4.16. Subsequent to installation of the HDD pipe and connection of the direct burial pipe to the HDD pipe, PG&E will perform a current drain inspection of the coating. PG&E estimates that this will take approximately four (4) hours.

18.9.4.17. The as-builts provided to PG&E by Contractor shall provide a tabulation of coordinates, referenced to the drilled entry point, which accurately describe the location of the pilot hole. This tabulation shall be in addition to, not in lieu of, the log of recorded readings provided for above.

18.10. Dry Auger Bore ("Jack and Bore")

18.10.1. As provided by Paragraph 13.2 above, Contractor shall verify electrical isolation between the natural gas pipeline and the metallic casing structure.

18.10.2. Contractor shall construct backstops as required to support and stabilize the boring and pipe-pushing equipment and bore pits for the entry and exit of the pipe. Contractor shall maintain the backstops and bore pits during the Work under the applicable CWA including, but not limited to, modifications to depth, width, height and shoring. Contractor shall construct the backstop within PG&E's right of way described in the applicable CWA

18.10.3. Contractor shall furnish, cut, align, and join the required length of sacrificial pipe with sufficient strength and thickness to withstand boring operation.

18.10.4. Contractor shall dry auger bore for the gas transmission pipeline in the order designated in the applicable CWA.

18.10.5. At each bore location designated on the construction drawings, Contractor shall install sacrificial pipe, of the same diameter as the mainline pipe, using the dry auger boring method. Contractor shall not allow the drill bit to advance in front of the leading edge of the sacrificial pipe more than six (6) inches. Contractor shall make every effort to avoid formation of voids ahead of the boring operation. At the midpoint of each bore, Contractor shall remove the augers from the pipe and check for proper grade and alignment. After PG&E's acceptance of the complete bore, Contractor shall remove all debris and augers from the sacrificial pipe. Acceptance by PG&E does not relieve Contractor of the responsibility to perform and warrant the Work as provided herein.

18.10.6. Contractor shall cut, align, and weld the entire length of transmission pipe in sections of the length designated in the applicable CWA and shall apply protective coatings to mainline pipe and field joints. Contractor shall weld the mainline pipe to the sacrificial pipe.

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18.10.7. Contractor shall push each welded section across the length of the bore until the leading end of the pipe is a minimum of ten (10) feet beyond the end of the bore to permit inspection of the protective coating. In the event any portion of such welded pipe should fail during Contractor's push of the pipe, such pipe failure shall be considered a bore failure and Contractor shall plug and abandon the bore in accordance with Paragraph 18.9. It is Contractor's responsibility to ensure the smooth, continuous, efficient push of the pipe.

18.10.8. Contractor will cut the sacrificial pipe in the receiving pits and dispose of the sacrificial pipe as necessary.

19. RESTORATION

19.1. Backfilling

19.1.1. Contractor shall secure the approval of PG&E before any backfilling is done. No backfilling shall be done until the pipelines and appurtenances have been inspected and As-Built drawings reviewed and accepted by PG&E. If any backfilling is done without said approval, PG&E shall have the right to require removal of the backfill for examination. The cost of such removal shall be borne by Contractor. Approval by PG&E does not relieve Contractor of the responsibility to perform and warrant the Work in accordance with this Contract.

19.2. Padding

19.2.1. Trenches shall be filled with padding material to at least twelve (12) inches above the top of the pipeline. The pipe shall be supported by a complete filling of the area under the pipe. This may be achieved by filling to the spring line and flooding the fill material.

19.2.2. Contractor shall ensure that all padding material is in accordance with PG&E California Gas Transmission Standard 4123.

19.3. Trench Fill

19.3.1. Contractor shall ensure that the remainder of the excavation is filled immediately after the padding material has been placed on top of the pipeline.

19.3.2. As provided by Paragraph 17.1.3.1 above, topsoil shall be replaced at its original grade level.

19.3.3. The remainder of the excavation may be filled with native material. Where the pipeline is laid on dedicated streets, roads and/or highways, Contractor shall ensure that the backfilling is done in accordance with the requirements of the agency having jurisdiction thereof.

19.3.4. Selected backfill or imported backfill, when required for filling excavations, shall be considered a normal part of Work at no additional cost to PG&E.

19.3.4.1. Native material may be substituted for sand if it contains no particle greater than one-quarter-inch diameter, has no sharp edges, and is of sufficient gradation to flow around pipe and/or facilities. Contractor shall ensure all voids are filled.

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- 19.3.5. Contractor shall exercise necessary precautions to prevent any large or sharp rocks from getting in the backfill material.
- 19.3.6. On embankment areas, Contractor shall fill the trench line beyond the toe of the slope and cut to required shape after compacting.
- 19.3.7. Contractor shall protect electrolysis test station assembly and wires during backfilling. If electrolysis test station leads are backfilled, they must be dug out at Contractor's expense.

19.4. Compaction:

- 19.4.1. Compaction of all padding and trench fill by Contractor will be required throughout the project, including backfilled excavations in highways, streets, driveways, railroad crossings, banks of creeks, canals, and ditches. Compaction shall be performed in accordance with construction drawings and all governmental rules, regulations, ordinances, and codes; property owners and/or tenant agreements; and jurisdictional agency permits. **CONTRACTOR SHALL GUARANTEE BACKFILL IN ALL LOCATIONS AGAINST SETTLEMENT FOR A PERIOD OF TWO YEARS AFTER COMPLETION OF WORK UNDER THE APPLICABLE CWA.**

- 19.4.2. Contractor shall retain the services of a compaction company for the performance of the compaction tests. Contractor shall coordinate with the compaction-testing contractor including, but not limited to, leaving some holes open during the backfill and compaction process to enable testing of specific lifts and Contractor returning to complete compaction and backfilling. PG&E will determine random locations for the compaction tests and the lifts at which the tests are to be taken. For the purpose of the proposal, Bidders shall assume that a compaction test will be performed approximately every 250 feet, at one-foot depth increments.

19.4.2.1. A compaction log shall be kept on a set of drawings in Contractor's office for review and shall be updated daily and be available to PG&E and/or the controlling agency, upon request.

19.4.2.2. Upon completion of all compaction tests, Contractor shall provide the written, certified compaction test reports to the PG&E on-site representative. The test reports shall clearly identify the pipeline stationing location and depth of the test and, if applicable, retests. The location (project station) and depth must be recorded on the report at the time of the test.

- 19.4.3. For the newly installed pipeline in agricultural lands, each layer of trench backfill shall be thoroughly compacted to no less than 85 percent of relative maximum compaction. All road crossings, roadways and driveways shall be compacted to 95 percent, or as indicated in the specific encroachment permit, within the road right of way. The level of compaction shall be determined by California Test Methods 216 or 231, or ASTM (current edition) D1557 and one of the following: D2922 or D1556.

- 19.4.4. At locations where native soil is allowed for backfilling, Contractor shall compact excavations to required density by jetting or other approved means. In

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jetting, excavations shall be backfilled in lifts no greater than eighteen (18) inches, jetted with water until material is soaked, and compact by tamping. After the excavations are filled and compacted, surplus material shall be bladed flat over the excavation and right of way.

- 19.4.5. Contractor shall ensure that methods used to place and compact backfill material are to the satisfaction of PG&E and the agency having jurisdiction thereof.

19.4.5.1. In the event a compaction test is failed, additional compaction tests will be performed at spacing intervals of 100 feet until a successful compaction test is performed. Contractor shall re-compact all trench between successful compaction tests and retest the re-compacted area at no additional cost to PG&E.

19.4.5.2. In addition to other requirements herein, PG&E will not consider the Work complete unless and until compaction of trenches meets the above requirements and PG&E has received documentation of compaction test results from the compaction testing contractor.

19.4.5.3. All Contractor costs to coordinate and supply compaction testing shall be included in Contractor's proposed price for compaction testing. In the event a location fails the compaction test, the cost to recompact and retest shall be borne by Contractor and shall not be invoiced to PG&E.

19.5. Cleanup

19.5.1. On a daily basis, Contractor shall collect and dispose of all metal trimmings, plastic shavings, waste electrodes, coating wastes, and other waste material off the job site at a location approved by PG&E. No scrap material of any type shall be left in the trench.

19.5.2. Contractor shall ensure that working areas and adjacent areas used in the performance of Work are restored to the original contours and left in a neat and presentable condition.

19.5.3. Any surplus excavated materials will become Contractor's property and shall be hauled away. The cost of such hauling will be included in the Contract price.

19.6. Pipeline Markers

19.6.1. Contractor shall install pipeline markers at locations shown on Construction Drawings in accordance with PG&E Gas Standard L-10.

19.7. Surface Restoration

19.7.1. Contractor shall leave any drainage ditches, culverts or natural drains which may have been affected during construction in good state of repair.

19.7.2. Contractor shall provide and maintain temporary repairs to paved and/or concrete surfaces, subsequent to backfilling and prior to making permanent repairs.

19.7.3. Contractor shall make permanent repairs to pavement and sidewalk where removed or damaged as a result of its operations. Contractor shall replace the surfacing and sub-grade in a manner, and with materials, satisfactory to PG&E

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and the governmental agency or other party having jurisdiction.
CONTRACTOR SHALL GUARANTEE THE SURFACING AGAINST
SETTLING, CRACKING OR OTHER DEFECTS FOR A PERIOD OF TWO
YEARS AFTER COMPLETION OF WORK UNDER THE APPLICABLE
CWA.

19.7.3.1. If the compaction or surfacing provided by Contractor settles, cracks, or develops defects within two years, Contractor shall repair or replace the damaged area at its own expense, in addition to any other remedies available to PG&E under this Contract. In the event Contractor fails, refuses, or is unable, for any reason, to repair or replace the damaged area in a timely manner, PG&E may repair or repave the damaged area, or hire another contractor to repair or repave the damaged area, at Contractor's expense.

19.7.4. Contractor shall remove all surface markings, such as USA markings and layout lines, to the satisfaction of PG&E and any jurisdictional agencies.

19.7.5. Contractor shall ensure that landscaping is replaced as near as practicable to, or better than, landscaping existing at the site before Work commenced, and that it is approved by owner or agency having jurisdiction thereof. Re-seeding shall be of a mixture and broadcast method approved by the property owner or governing agency.

19.7.6. Contractor shall ensure that all private property including, but not limited to, fences, private roads, and irrigation and drainage structures, is left in good repair. Where replacement of removed facilities is required, the replacements shall be of the same or better quality than the original facilities. All such work shall be performed to the satisfaction of PG&E, landowner, and/or tenant.

19.8. As frequently as practicable during the performance of Work but in no event less frequently than in Contractor's weekly progress report, Contractor shall provide a detailed description of the affect of construction activities on adjacent property such as crops or landscaping.

20. PROJECT DOCUMENTATION

20.1. In addition to other documentation required by this Specification, the CWA, and the General Conditions to this Contract, upon completion of all Work under the applicable CWA, Contractor shall provide final documentation to the PG&E Project Manager including, but not limited to:

20.2. Regulatory permits signed on behalf of the governing agency, indicating that Contractor has satisfactorily complied with permit requirements.

20.3. Agreements, if any, with landowners and/or tenants as required in Paragraph 5.7 of this Specification.

20.4. As provided by Paragraph 5.4.2.2 of this Specification, signature by property owner or tenant, indicating that Contractor has repaired or replaced access roads, ancillary sites used, fences, gates, culverts and other appurtenances, and has satisfactorily complied with applicable agreements.

20.5. Pre- and post-construction video tapes of the construction right of way.

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- 20.6. Log of public contacts as required in Section 5.6 of this Specification.
- 20.7. All documentation required in Section 12 of this Specification.
- 20.8. As required in Paragraph 5.16.3 of this Specification, material certification and/or testing documents.

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**REQUIREMENTS FOR AS-BUILT DRAWINGS
FOR
DOCUMENTATION OF CONSTRUCTION OF PG&E
NATURAL GAS TRANSMISSION PIPELINES**

This document provides specific requirements for the preparation of as-built drawings and is in addition to, not in lieu of, the requirements of Specification No. 13024 and the project-specific requirements to which it is attached. In the event of conflict, the most stringent requirement shall prevail. In the event Contractor determines that a conflict exists, Contractor shall immediately notify the PG&E Construction Manager.

1. AS-BUILT DRAWINGS

1.1. For all Work under any Contract for construction of natural gas transmission pipeline(s), Contractor shall update one set of Construction Drawings daily with all corrected As-Built dimensions and information. Piping symbols shall be in accordance with PG&E Gas Standard N-90. Unless otherwise specifically required in the project-specific specifications, all As-Built data described in Section 2 below shall be located by GPS.

1.1.1. Contractor shall make As-Built Construction Drawings available to PG&E at the job site at all times. Contractor shall maintain only one set of redline marked up drawings at the site; multiple copies are not permitted.

2. GPS Data

2.1. An As-Built survey will collect GPS data during construction of the pipeline project to inventory features as well as document their position and configuration. This information will be utilized in PG&E's GIS system.

2.2. The As-Built survey contractor will provide the PG&E GIS mapping team with data in the following horizontal datum and projection: NAD 83 UTM ZONE 10 North (meters). If the data was collected in other formats, i.e., State Plane, in the boundaries of NAD 83 UTM ZONE 11 North, it would still be converted to the required NAD83 UTM ZONE 10 North (meters), because PG&E normalizes all data to Zone 10 even if in Zone 11. Elevation units to be in feet.

2.3. All GPS data will be provided in a .CSV tabular file, with fields accurately representing the specifications and terminology of the Data Dictionary, along with NORTHING, EASTING, and ELEV fields. Data delivery to Jeff Nicholson via e-mail JANE@pge.com.

2.3.1. An alternative to .CSV tabular format would be ESRI shapefile(s) created from the tabular coordinates which carry all of the same specifications of the data dictionary.

2.4. The minimum electronic data to be collected is as follows:

2.4.1. All valves, horizontal angle points, and tie-in welds.

- 2.4.2. All data submitted shall be provided with a transmittal information sheet, in Excel format, detailing the following fields that are to be filled out for every file delivered.
 - 2.4.2.1. File Number, file name, job number, date created, the individual and company name who created the file along with a contact phone number, the projection/coordinate system and a general description of the file content.
3. To produce complete As-Built Construction Drawings, Contractor shall make notations and corrections, in red, on four sets of Construction Drawings, to all of the following:
 - 3.1. Correct pipeline dimensioning, using approved field notes.
 - 3.2. Update all quantities on the bill of materials.
 - 3.3. Serial numbers of valves and other major equipment shall be included on the As-Built drawings.
 - 3.4. Provide documentation as to locations of all field girth welds, angle points, weld numbers and depths. Angle points will be documented on the As-Built drawings.
 - 3.5. Identify changes in pipe wall thickness, grade, coating and locations of test sectioning.
 - 3.6. For all dimensions and information that match the original design exactly, Contractor shall verify, by circling in red, the design dimension on Construction Drawings.
4. Prior to pressure testing, Contractor shall provide a single line drawing for attachment to the strength test pressure report indicating:
 - 4.1. All as-installed pipe lengths by size, grade and wall thickness.
 - 4.2. All as-installed pipe fittings and appurtenances by grade, size and wall thickness.
 - 4.3. Elevations of high and low points on the as-installed system.
 - 4.4. Actual location and elevation of the hydrostatic strength test gauge.
5. Contractor shall provide a complete set of corrected As-Built Construction Drawings to PG&E within 14 calendar days after the completion of installation and pressure testing of the pipeline. The As-Built package shall consist of:
 - 5.1. All As-Built Construction Drawings.
 - 5.2. Original Strength Test Pressure Report, accepted by PG&E, with as-tested sketch – the original STAYS AT THE SITE with the Construction Manager. This report shall include the completed original charts and the original dead weight

log. Contractor shall allow sufficient time for review by the designated PG&E Pipeline Engineer prior to acceptance of the report by PG&E.

APPENDIX A

Example of Data Dictionary Menu – GPS Data Collection for As-Built

Bends	(Taken at center of bend)	
Type**	(Menu)	
	Angle point	
	Side bend	
	Sag bend	
	Over bend	
	Other	
	Unknown	
Degree	(Number field)	0.0
Notes	(Text Field) 100 Characters	
Pipe Joint		
Type**	(Menu)	
	Tie-in	
	Bore	
	Flange	
	Main Line	
	Fitting	
	Other	
	Unknown	
OD**	(Number Field)	00.000
Status**	(Menu)	
	New	
	Deactivated	
Weld ID	(Text Field) 20 Characters	
X-Ray #	(Text Field) 20 Characters	
Station	(Text Field) 20 Characters	
WT1	(Number Field)	0.000
WT2	(Number Field)	0.000
Hydro Begin	(Text Field) 50 Characters	
Hydro End	(Text Field) 50 Characters	
Sniff hole WT	(Number Field)	0.000
Notes	(Text Field) 100 Characters	

CP Test Station Type**	(Menu) ETS Coupon Current Span Other Unknown	
Location	(Menu) Wire at pipe Wire at grade	
Notes	(Text Field)	100 Characters
CP Anode Type**	(Menu) Deep Well Shallow Bed Horizontal Block Other Unknown	
Material	(Menu) Graphite Magnesium Zinc Magnesium-High Potential Other Unknown	
Usage	(Menu) Grounding Electrode Impressed Sacrificial Other Unknown	
Notes	(Text Field)	100 Characters
CP Rectifier Type**	(Menu) CP Rectifier General Rectifier Bond Rectifier Other Unknown	
Location	(Menu) Wire at pipe Wire at Pole	
Notes	(Text Field)	100 Characters

Bore		
Bore Site**	(Menu) Entry Exit	
Notes	(Text Field)	100 Characters
Valve		
Type**	(Menu) Ball Plug Other Unknown	
ValveDia**	(Number Field)	00.000
Control**	(Menu) Yes No	
ValveUse**	(Menu) Blow Down Bypass Fire Isolation Service Shut Down Other Unknown	
Notes	(Text Field)	100 Characters
Fittings		
Elbow	(Menu) Short Long 3R	
ElbowDeg	(Menu) 45 90 Other	
Reducer	(Text Field)	100 Characters
Tee	(Text Field)	100 Characters
Cntrl Fitting	(Menu) Bottom out Side out Pin off tees	
Manufacturer	(Menu) TDW Mueller Other	
Tap Orifice Type	(Menu)	

		Intersection Hole (Number Field)	00
Tap Orifice OD			
Misc Fitting (Menu)			
		Insulator	
		Sav-A-Valve	
		Transition	
		Joint	
		Flange	
		Expansion	
		Coupling	
		Compression	
		End Cap	
		Other	
		Unknown	
Notes		(Text Field)	100 Characters
Crossings			
PVC OD		(Number Field)	00
Steel OD		(Number Field)	00
Concrete OD		(Number Field)	00
Notes		(Text Field)	100 Characters
Topography			
Grade		(Menu)	
		Break	
		Finish	
Slope		(Menu)	
		Toe	
		Top	
P/L Marker		(Menu)	
		Slash Marker	
		Orange Post	
		Panel Marker	
		Other	
		Unknown	
Notes		(Text Field)	100 Characters
Street			
Name		(Text Field)	100 Characters
Street align		(Menu)	
		Edge of Road	
		Edge of Hwy	
		Edge of Pavement	
		CL of Street	
		Face of Curb	
		Other	

Notes	Unknown (Text Field) 100 Characters
Fence Type**	(Menu) Fence line Fence Corner Gate post Other Unknown
Notes	(Text Field) 100 Characters
Drains Type**	(Menu) Storm Surface Catch Basin Other Unknown
Notes	(Text Field) 100 Characters
Building Type**	(Menu) Building corner Slab corner Other Unknown
Notes	(Text Field) 100 Characters
Pole Type**	(Menu) Light Pole Street Light Power Pole Guy Pole Guy\Anchor Other Unknown
Notes	(Text Field) 100 Characters
Pot Hole Utility**	(Menu) Gas Petrochemical Irrigation Water Storm Drain

	Sewer	
	Crude Oil	
	Fiber Optics	
	Underground Electric	
	Refined Products	
	Telco	
	Other	
	Unknown	
Material Type**	(Menu)	
	Concrete	
	Cast Iron	
	Steel	
	Plastic	
	CMP	
	Cable	
	Other	
	Unknown	
OD**	(Number Field)	00
Cover	(Number Field)	000
Notes	(Text Field)	100 Characters Notes
Monument		
Type**	(Menu)	
	Brass Cap	
	Rebar Cap	
	Iron Pipe	
	Nail Shiner	
	Other	
	Unknown	
Agency**	(Menu)	
	Cal Trans	
	Developer	
	PGE	
	BLM	
	USGS	
	City	
	County	
	Other	
	Unknown	
Notes	(Text Field)	100 Characters Notes
Wrap Type Changes		
Type	(Text Field)	50 Characters
Property Line		
APN	(Text Field)	50 Characters

Misc.	
Type	(Menu) Railroad Track Edge of Canel Fire Hydrant Box Other
Notes**	(Text Field) 100 Characters

**** Required field entry**

1. GENERAL

1.1 These Horizontal Directional Drilling (HDD) Specification requirements are attached to and made a part of Specification No. 13024 and are in addition to, not in lieu of, the requirements of Specification 13024. In addition, these HDD requirements are in addition to, not in lieu of, the requirements of the Project Specific Conditions of any contract awarded by PG&E for HDD installation. In the event of conflict in the terms of any of these documents, the most stringent requirement shall prevail.

1.2 In the event Contractor determines that a conflict exists, Contractor shall immediately advise the PG&E Project Manager of the details of the conflict. Contractor shall not proceed with the tasks that are the subject of the conflict until instructed how to proceed by the PG&E Project Manager.

2. EQUIPMENT

2.1 The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback the pipe; a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the crossing; a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be re-used; a guidance system to accurately guide boring operations; a vacuum truck of sufficient capacity to handle the drilling fluid volume; and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of the project.

3. PROJECT DATA

3.1 PG&E does not warrant the accuracy, validity or applicability of the information provided to Contractor regarding soil conditions, water sources, existing infrastructure and environmental constraints. Contractor shall field-verify actual field conditions. Contractor shall determine to its own satisfaction the conditions affecting the HDD.

3.2 General Contractor Responsibilities

3.2.1 Rig selection that is fit for purpose.

3.2.2 Providing drill and pullback services that do not damage the pipeline.

3.2.3 Coordination and scheduling of the HDD with PG&E's General Construction (GC) organization and other Contractors as needed.

3.2.4 Final design of borehole trajectory and reaming plan for approval by PG&E.

3.2.5 Providing all information or plans required by regulatory agency, Specification No. 13024 and Project Specific Conditions.

3.2.6 Requesting adjustments to the location of the entry and exit points, or changes to the alignment of the HDD segment to improve its constructability, or to meet other objectives.

3.2.7 Providing rollers adequate in number, type, and strength to support the entire length of the HDD segment, ensuring that neither pipe nor coating is damaged during pullback.

3.2.8 Underground Services Alert (USA) notification and project delineation.

3.2.9 Pothole all existing infrastructure to be crossed during the bore to verify exact location and depth (show on As-Built) and to make changes to the plan, based on the results

of the potholing program, or modifying the alignment of the HDD alignment, if such changes and modifications are approved by PG&E.

3.2.10 Prior to commencement of the directional drilling, establish a Survey Grid Line and provide a program of monitoring the actual location of the borehole during drilling operations. In addition, upon completion of the HDD installation, contractor shall provide an accurate as-built drawing of the installed HDD segment.

3.2.11 Securing water source and disposal of drilling fluids.

3.2.12 Submission of detailed as-built showing exact location of all welds within the borehole.

3.2.13 Coordinating with all appropriate agencies and other subcontracted clean up entities in the event of Frac-Out.

3.3 Environmental Constraints

3.3.1 Trench Ramps:

3.3.1.1 Where the construction activity requires excavations that must be left open overnight, Contractor must provide ramps to allow for escape of species that may be entrapped in open excavations.

3.3.2 Storm Water Pollution Prevention Plan (SWPP):

3.3.2.1 Drilling Contractor shall comply with the project-specific Storm Water Pollution Prevention Plan (SWPP) and will dispose of all drilling fluids in accordance with federal, state and local laws, rules and regulations as well as any applicable landowner agreements. Contractor shall maintain erosion control materials (silt fence, hay bales, etc.) on site, as required to contain all fugitive emissions of drilling fluids.

3.3.3 Inadvertent returns (Frac-out):

3.3.3.1 Contractor shall employ its best efforts to maintain full annular circulation of drilling fluids. Drilling fluid returns at locations other than the entry and exit points shall be minimized. In the event that annular circulation is lost, Contractor shall take steps to restore circulation. If inadvertent surface returns of drilling fluids occur, they shall be immediately contained with hand placed barriers (i.e. hay bales, sand bags, silt fences, etc.) and collected using pumps as practical. If the amount of the surface return is not great enough to allow practical collection and if permitted by the applicable permit or landowner agreement, the affected area shall be diluted with fresh water and the fluid will be allowed to dry and dissipate naturally. If the amount of the surface return exceeds that which can be contained with hand placed barriers, small collection sumps (less than 5 cubic yards) may be used. If the amount of the surface return exceeds that which can be contained and collected using small sumps, drilling operations shall be suspended until surface return volumes can be brought under control.

3.3.4 Noise Abatement:

3.3.4.1 Drilling noise may be a significant issue with some HDD installations. Where PG&E has determined that drilling noise needs to be limited, Contractor's proposed HDD Drilling Plan will describe the means by which Contractor shall provide noise abatement, and other methods of limiting noise complaints, or disturbance to wildlife from drilling noise.

3.3.5 Contaminated Sites:

3.3.5.1 PG&E and Contractor will develop criteria and sampling protocols to determine when drilling fluids are to be classified and handled as hazardous waste.

3.4 Submittals

3.4.1 With the Proposal

3.4.1.1 Resume of proposed on-site drilling supervisor.